

China Painting Dictionary

A B C

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The Netherlands
Porcelain Painters Society
(as given to Sol Brien in 2006 and later
updated by Henk and Sol)

A

Abrasives

Aluminum oxide (Al_2O_3), Silicon carbide (SiC) are the most important materials for grinding and polishing in all kind of industries. Also for ceramics. But when Silicon carbide is used special care must be taken for cleaning. When silicon carbide particles stay behind they can react with the glaze and paint. At temperatures of 700 °C or higher silicon carbide act as a reducing component. When using a copper oxide containing glaze or paint the normal green color will change to red. Also other colors might change and giving dark spots.

Aceite de palo.

See: Balsam of Copaiba.

Acetate.

Acetate paper is a semi transparent tracing aid. Place shiny side down and then trace your pattern with a pencil on the non-shiny side.

Acetone.

Acetone CH_3COCH_3 or Dimethylketon (DMK) or 2-propanon is also formed in small amounts in our body. Diabetics breath can contain acetone what you can smell. The MAC (maximum allowable concentration) is 750 ppm (parts per million) or 1780 mg/m^3 . It gives irritation of eyes , lungs and skin. It dissolves all kind of fat so it dries your skin extremely. Use gloves (no vinyl or latex) to handle it. Taking care, acetone can be used safely for cleaning your plates before painting. Larger amounts are toxic. Inhalation may lead to hepatotoxic liver damage. It is very lightly flammable so do not use it by open fire.

Accidental spill of essential oils on your skin.

Remove the oil as soon as possible with a (paper) towel.

Then use lots of baby, olive, ground-nut or sunflower oil to dilute the essential oil and wipe off with (paper) towel. Repeat this until you do not smell the essential oil any longer. Rinsing off with water is not effective

Adherence of burnishing gold.

To apply liquid burnishing gold on a bisque part of porcelain first apply a layer of liquid bright gold to give a better adherence. After firing apply a layer of the burnishing gold. Take care not to touch the bright gold with your fingers as that will give problems. Also do not touch the burnishing gold with your fingers before you have polished it.

Agate burnisher.

Agate is the crystalline form of quartz (SiO_2).

Agate burnishers are polished agate stones. They are used for polishing matt gold on porcelain or to create polished designs on the finished matt gold surface.

Aluminum oxide.

Synonyms; Corundum, Al_2O_3 The mineral corundum is widely used as grinding material. Pure Aluminum oxide in crystallized form is known as ruby and sapphire. Traces of chromium give the red color of ruby and traces of titanium and iron the blue color of sapphire. Aluminum oxide with a melting point of 2050 °C is one of the

basic components of clay and glazes. It improves the corrosion and erosion resistance of glazes. High amounts of an Aluminum oxide result in matt glazes. It's also used as a kiln wash to prevent sticking of glass or glazed objects to the bottom plates during firing. Combination of Aluminum oxide with pigments improves the stability at high temperatures. (See also; kaolin, bentonite, kiln wash, glazes.)

Allergy.

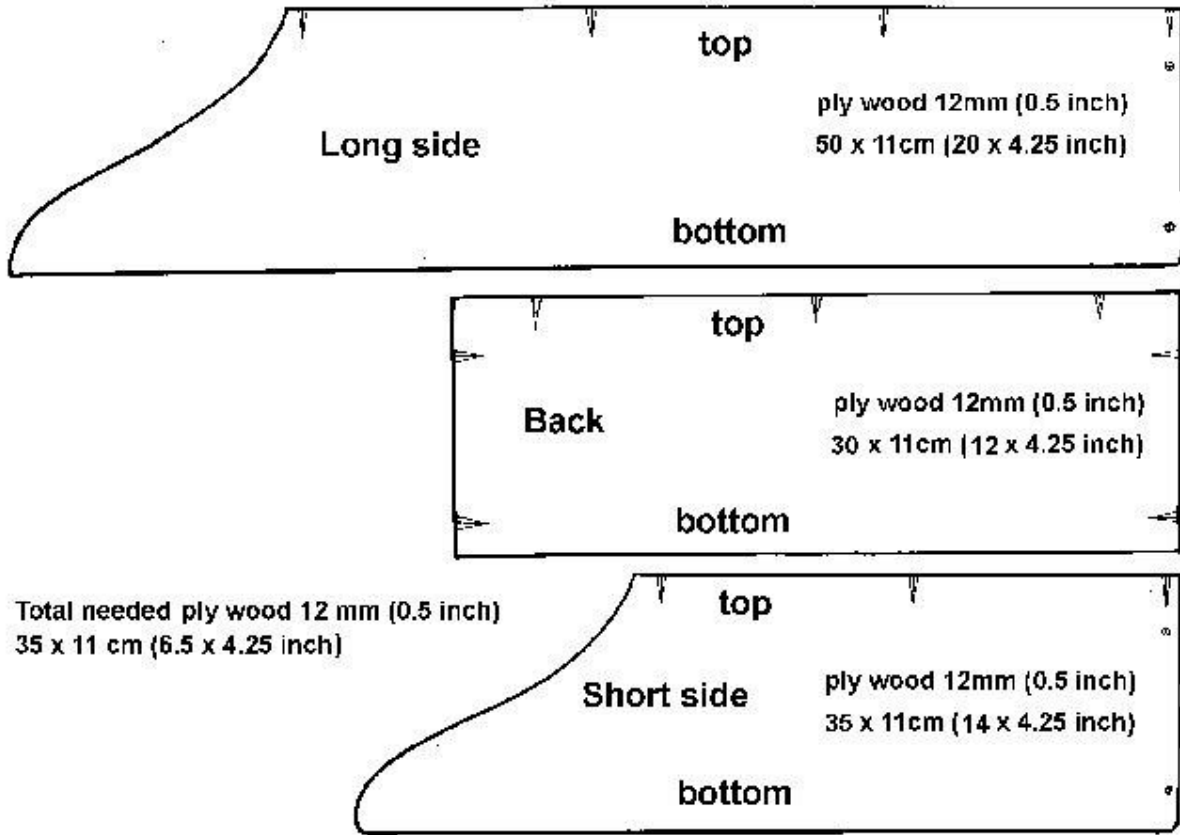
An allergy occurs when the body's immune system overreacts to normally harmless substances. Allergic reactions are caused by substances in the environment known as allergens. Almost anything can be an allergen for someone. The most common allergens are: pollen from trees and grasses, house dust mite, molds, pets such as cats and dogs, insects like wasps and bees, industrial and household chemicals, medicines, and foods such as milk and eggs. For porcelain painters the most important allergen is "turpentine". Those painters should use "copaiba" or "water-base" mediums instead. Also the lavender oils (lavender, lavandin, spike) and clove oil are frequently mentioned to give allergic reactions. Then use of "rosemary" oil is advised.

Armrest.

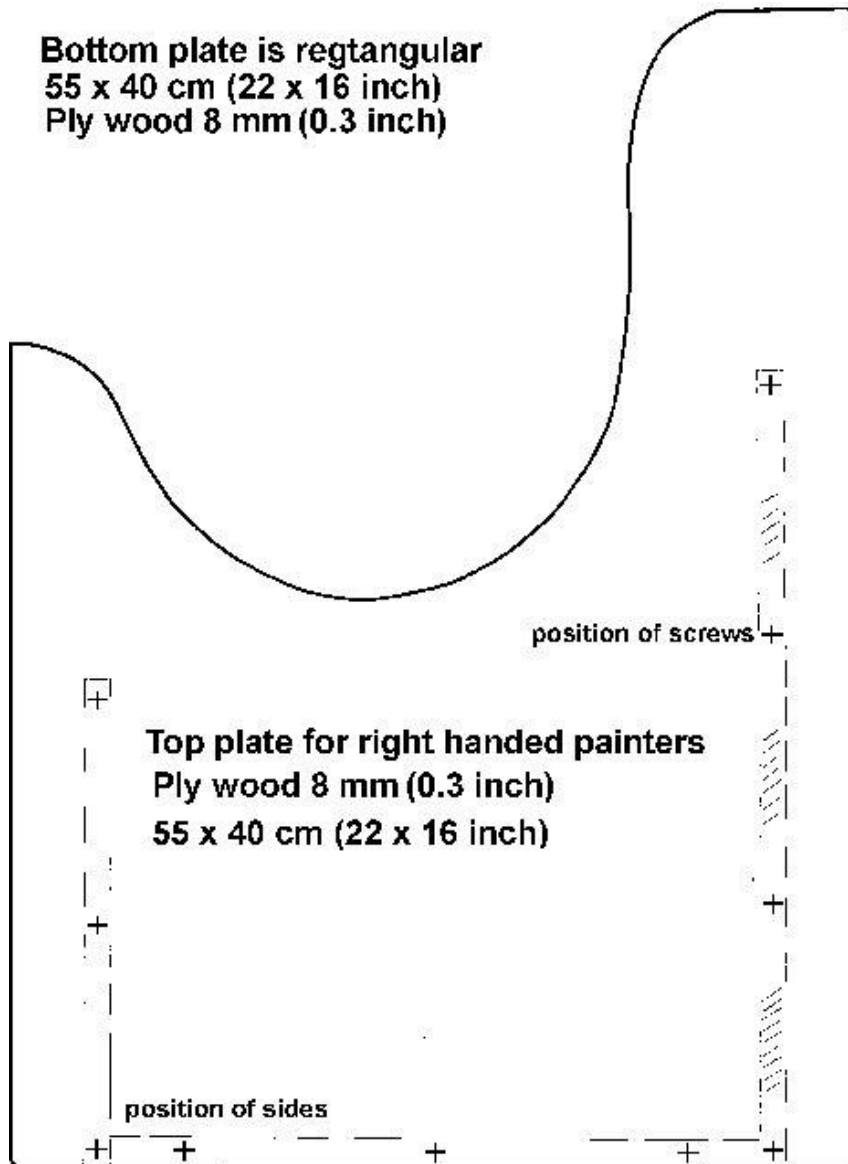
To ease painting a simple armrest can be made out of plywood. In the picture a right-handed armrest is shown but it can also be made mirror like for left-handed painters.



Also the drawings for the armrest based on information obtained from Uwe Geissler, Andreas Knobl, Frida Herbold and many others in Germany.
See:



and also



Ashes of roses.

This is a grey-blue-red used in China around 1700.

Franz Bischoff invented around 1900 his own version of Ashes of roses. See;

<http://www.tfaoi.com/distingu/fb1.htm>

See also; Pink to ruby porcelain colors.

Aspic oil.

Spike lavender oil, also called Lavender Spike or just Spike Oil is known in France as Aspic. The oil is steam distilled from the flowering tops of the stout plant, *Lavandula Latifolia* which, together with true lavender, are the parents of the hybrid Lavandin.

The spike or aspic plant grows wild in or around its homeland, the Mediterranean countries, particularly in Spain, France, Yugoslavia, Italy and scattered in many places in North Africa and the eastern Mediterranean countries and islands. It is used to keep fat oil or Copaiba balsam longer open.

B

B of C

See: Balsam of Copaiba.

B'samo de copayba.

See: Balsam of Copaiba.

Balm of Gilead.

See: Canada Balsam.

Balsam Fir.

See: Canada Balsam. **Canada Balsam** is the pale yellow oleoresin with a faint greenish cast of the **balsam** fir tree. It dries to a clear transparent film. It is used as a plasticizing resin for varnishes and paints. **Canada balsam** is amorphous when dried.

Balsam of Copaiba.

(Synonyms: Copaiba, copaipera, cupayba, copauba, copal, copaiva, copaiba-verdadeira, Jesuit's balsam, copaibeura-de-Minas, cobeni, Matidisguate, matisihuati, mal-dos-sete-dias, aceite de palo, pau-de-oleo, b'samo de copayba)

Balsam of Copaiba is the oleoresin from the *Copaifera Langsdorfii* tree. This large tree is found in the tropical rain forest of South America. It is harvested by tapping or drilling holes into the wood of the trunk and collecting the resin that drips out. A single *Copaifera Langsdorfii* tree can provide about 40 litres of oleoresin per year. In the Amazon copaiba is used topically by indigenous tribes and healers as a cicatrizant for skin sores for all types of pain, insect bites, and to cool inflammation. In Brazilian herbal medicine today it is used as a strong antiseptic and expectorant for the respiratory and the urinary tract, as a topical anti-inflammatory agent for all types of skin disorders.

And porcelain painters use it as a non toxic non allergic painting medium. The initial oily resin is clear, thin, and colourless; it thickens and darkens upon contact with air. To make it thinner small additions of essential oils like Rosemary, Clove and Lavender are used. The vapours of pure Clove oil and Lavender oil are irritating eyes and lungs.

The painters of the famous Porcelain Manufacturers Hutschenreuter & Rosenthal in Germany use only Copaiba with Rosemary or Clove, as painting medium.

Barium sulfate.

Barium sulfate $BaSO_4$ is used as a mattifying agent added to fluxed colors. Barium sulfate is used as a contrast substance for X-ray examination.

Banding wheel

The best banding wheel I have found is to get a child's record player (or any old record player) at Goodwill or similar and remove the center post.

Plug it in and turn it on low. The speed will be consistent and you can concentrate on the bands. Attach a plate divider and use it to center the plate.

Base For Gold

Base for gold is a white powder which when mixed with oil will give a raised surface that can be tinted with china paints for a coloured enamel look. Leave white for accent touches such as highlights. Once fired, it can be covered with gold for a beautiful raised gold look. It can also be used to fuse glass to porcelain. I-Relief is basically the same thing but will give a higher texture.

For further information on gold, see;

<http://www.porcelainpainters.com/goldhome.html>

Bat wash.

See; Kiln wash.

Bentonite.

Bentonite is a clay generated from the alteration of volcanic ash. Bentonites are not toxic.

There are two main types of Bentonite:

Natural Sodium Bentonite (Synonym; Sodium Montmorillonite)

Natural Calcium Montmorillonite (Synonym; Calcium Bentonite)

Natural sodium bentonite originates from its discovery near Fort Benton, USA.

Sodium-Bentonite, consisting of smectite three-layer clay minerals. They consist of two tetrahedral layers and one octahedral layer.

The extent of hydration produces intercrystalline swelling. Sodium-Bentonite presents strong colloidal properties and its volume increases several times when coming into contact with water, creating a gelatinous viscous fluid. Sodium-Bentonite is widely used in glazes and porcelain casting clays.

Natural Calcium Montmorillonite originates from Montmorillon in France. Calcium bentonites are characterized by much lower swelling and liquid limit values compared to natural sodium bentonite.

Sodium activated Montmorillonites are produced by the substitution of calcium by sodium. This transformation can be achieved by the addition of a soluble sodium salt to calcium montmorillonites.

Berry brush.

A berry brush is a small pointed brush, about a #3 Dresden Brush, used to wipe out berries.

BFG.

See: Base For Gold.

Bisque. Synonym; biscuit.

Low fired unglazed objects, normally not or partly vitrified to be finished at a later time. High fired completely vitrified ornamental finished objects like figurines, statues, animals and translucent plates. Also non-glazed parts of porcelain objects acting as an ornamental point of interest.

Black porcelain.

Porcelain with a body completely colored black with cobalt and manganese oxides, fired in the range of 1250-1350°C to a complete vitrified state. Rosenthal in Selb Germany brought it on the market about 1970. See also, Porcelain Noir, Black stoneware. Black stoneware, Black Basalt, Egyptian Black Basalt. Stoneware with a body completely colored black with cobalt and manganese oxides, fired in the range of 1200-1315°C to a normally partially vitrified state. Josiah Wedgwood first advertised it in 1774. See also Porcelain noire.

Blue resist gel.

A gel made of toluene, also known as toluol or methylbenzene. This liquid masking resist is waterproof. Frequent inhalation of toluene vapour must be avoided as this can lead to brain damage. See: Toluene.

Body stains.

Originally minerals containing high amounts of metal oxides were used to give certain colours to clay and glazes. Cobalt blue, Copper green, Chromium yellow-pink, Nickel blue, manganese violet-brown, Iron rot-brown. The resulting colour was greatly influenced by the composition of the clay or glaze used. With the better understanding of the chemical and physical reactions during firing glazed ceramics and high purity materials for stains practically every colour can be obtained. But still the combination of glaze and porcelain paint result in a certain colour. Using the same paint on an other type of glaze might give a complete different colour ! Also the temperature is a controlling factor. Furthermore the kiln atmosphere, In most of our kilns oxidizing but under certain conditions reducing.

Some examples;

-Tin-base glaze plus gray copper oxide gives an transparent bright red colour in reducing atmosphere and a green colour in oxidizing atmosphere.

-Nickel oxide in a borate containing glaze give bright yellow, adding zinc oxide turns the colour in rose - aquamarine - light blue! Using a lead base glaze gives violet or dark brown!

-Chromium oxide is temperature dependent; in a normal lead base glaze at 900°C red, at 950°C red-green, at 1000°C dark green. Increasing holding time makes greener.

-Painting first with a normal yellow and later with red will result in a disaster, its impossible to get any red over the yellow. Always paint first the red and then the yellow.

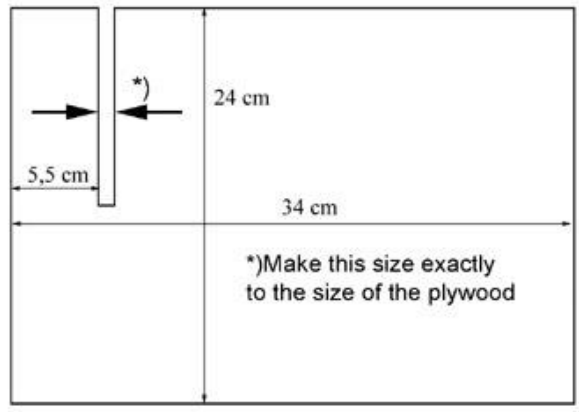
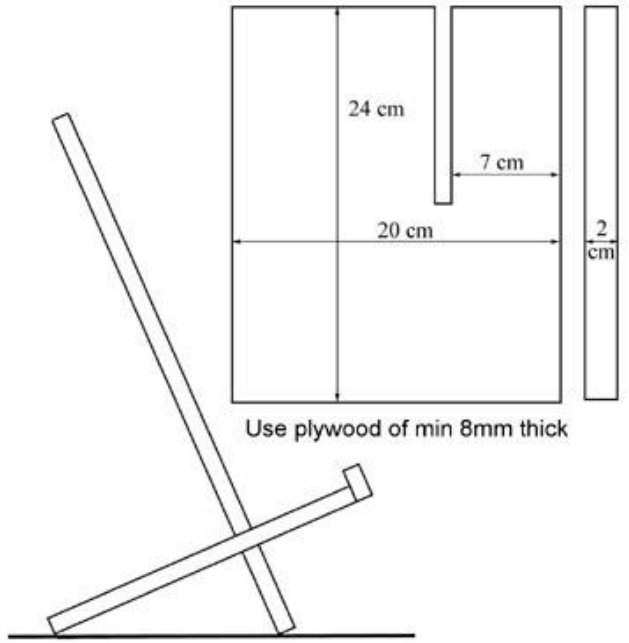
-When you like to combine yellow with another colour use the special "mixing yellow".

Bone China.

See; Porcelain.

Bookstand.

A very simple bookstand can be made from plywood, see the photo and the design. Do not glue the two parts, then you can take the separate parts more easy with you.



Brushes.

See; Hair for brushes. Mop Brush. Stippler Brush.

Bunny brush.

See; Mop brush.

Burnishing.

See: Polishing.

C

Canada balsam.

Synonyms; Balsam Fir, Balm of Gilead.

Obtained from the Canadian Pine tree "Abies Balsamea" (Pinus Balsamea). Like Copaiba, Canada Balsam is an effective antiseptic and healing agent used as a healing and analgesic protective covering for burns, bruises, wounds. The resin is said to be also antiscorbutic, diaphoretic, diuretic. It was widely used medicinally by various North American Indian tribes.

Carnation oil.

Carnation (*Dianthus caryophyllus*) holds an important place in perfumery. Southern France, Italy, Egypt, and Kenya are now the main sources of carnation flowers for perfumery use. The flowers are extracted with volatile solvents and on treatment with alcohol gives carnation absolute. Steam-distilled flowers are used for carnation oil. There is a difference in chemical compositions of absolutes and steam-distilled oils. Carnation absolute is very expensive and only used for perfumes and in de luxe fragrances, because of its high price. Synthetic carnation compounds or their components have replaced the absolute in less expensive perfumes. To check carnation absolute for purity place a drop on a piece of paper, it will evaporate quickly and leave no oily mark indicating that it has not been cut with vegetable oils. Those cheaper Carnation oils are sometime used as medium for porcelain painting due to its nice flavor, the properties are in general similar to other vegetable oils. As the main components of carnation are eugenol derivatives the cheaper so called carnation oil is perfumed clove oil. (*Oleum Caryophyllus*) The porcelain painting property of such oil is the same as clove oil (*Oleum Caryophylli*)

Carving.

Carving is wiping back areas of paint to create a pattern such as leaves and stems. This creates a background pattern.

Cats tongue brush.

A cats tongue is a brush that tapers gently to a rounded point, like a cats tongue.

Cave paintings.

The 15000-20000 year old cave paintings of Altamira and Lascaux were already painted with brushes made of animal hair connected to sticks!!! See; Hair for brushes.

The Altamira cave is situated in the North of Spain.

http://www.deutsches-museum.de/e_index.htm

The Lascaux cave is situated in the Dordogne France.

<http://www.culture.gouv.fr/culture/arcnat/lascaux/en/>

Both caves are not any longer open for the public to preserve the paintings. Exact to scale copies are made for the public. See above web sites.

Celadon.

Celadon porcelain is characterized by its jade-like glaze, originally produced in the Longquan County, in the Zhejiang Province, known as longquan qingci. This Chinese name means greenish porcelain. Originally produced by using porcelain clay with additions of minerals containing traces of iron, chromium, nickel, tin and titanium. A reducing atmosphere was obtained in firing with cherry and cedar wood. With our modern glazes and pigments and firing under oxidizing conditions we still cannot compete the real celadon.

Ceramics

Ceramics are fired earthy minerals like aluminum-, magnesium-, calcium-, and silicon-oxides and combined compounds. Modern manufacturing methods with chemically prepared powders as a starting material in order to control purity, heterogeneity, particle-size and distribution, are used for special purpose advanced ceramics.

Ceramics cover; structural clay products, white-wares, refractories, glasses, abrasives, cements and advanced ceramics including bio-ceramics, superconductors, magnets, etc.

White-wares include dinnerware, floor and wall tiles, sanitary ware, electrical porcelain and decorative items.

Glasses include flat glass (windows), container glass (bottles), pressed and blown glass (dinnerware and decorative items), glass fibres (home insulation), and advanced/specialty glass (optical fibres)

Ceramic structure.

The atoms in ceramic materials are held together by a chemical bond. The micro structure can be entirely crystalline (pottery, earthen-ware, stone-ware, low grades porcelain); or a combination of crystalline and glassy (vitrified porcelains, bone China), or entirely glassy (glasses only) In the combination of crystalline and glassy, the glassy phase usually surrounds small crystals, bonding them together. The atomic structures primarily affect the chemical, physical, thermal, electrical, magnetic, and optical properties. The micro structure also affects these properties but has its major effect on mechanical properties.

Ceramic properties.

Generally speaking, ceramics are; hard, wear-resistant, brittle, refractory, thermal insulators, electrical insulators, nonmagnetic, oxidation resistant, prone to thermal shock, and chemically stable. Of course there are many exceptions to these generalizations. For example, borosilicate glasses and certain glass ceramics are very resistant to thermal shock. Also, some ceramics are excellent electrical conductors and an entire commercial market is based on the fact that certain ceramics (ferrites) are magnetic.

Ceramic compositions.

Originally potters used the clay from the area where they lived, giving a great variation in clay compositions used. Furthermore the construction of the wood fired

kilns and the experience of the potter defined the quality of his product. The everywhere available ball clay and low firing temperatures resulted in the common earthenware. The Chinese kaolin clay and higher firing temperatures resulted in the first porcelain.

Certain places are still famous for their high quality kaolin (Guangxi in China, Piedmont plateau in Georgia, Saskatchewan in Canada, Limoges in France)

See also; Earthenware. Stoneware, Porcelain, Bone China.

Ceramic glazes.

A glaze is a vitreous coating to a ceramic material whose primary purposes are protection and decoration. Glazes can be considered specialized forms of glass and described as amorphous solids.

Glazing is functionally important for pottery, earthenware and stoneware vessels, which would otherwise be unsuitable for holding liquids due to porosity. Glaze is also functionally and decoratively used on porcelain. In addition, aesthetic concerns include a smooth pleasing surface, the degree of gloss and finished colour. Glazes may also enhance an underlying design or texture which may be either the natural texture of the clay or an inscribed, carved or painted design.

Decoration applied under the glaze is generally referred to as under-glaze. Examples of underglazes decorations are the well known "blue and white" porcelain originally produced in China and Japan and the Dutch "Delft's Blue". The striking blue colour is achieved by using the powerful coloring cobalt oxide or cobalt carbonate, both of which are still commonly used in glaze and ceramic pigment formulations today. Decoration applied on top of a layer of glaze, is referred to as overglaze. Overglaze methods include on-glaze decoration fired at temperatures of 780-840°C and in-glaze decoration fired at temperatures of 1150-1240°C or by applying precious metals over the glaze.

Apart from the transparent glazes numerous special creative glazes include coloured, crystalline, special effect and crackled glazes. Also special purpose glazes for medical (dental) and industrial applications are on the market.

Cerium oxide polishing powder.

Cerium oxide polishing powder <0.1 micron gives the most fantastic shine. This product can be obtained from lapidary shops. See: Burnishing, Polishing.

Chelsea Claret.

From 1745 to 1784 the Chelsea factory was the most important of the English porcelain works. Their objects rich and splendid. They invented in 1759 the famous Chelsea claret color employed on its vases. See; Pink to ruby porcelain colors.

Circle divider tool.

To divide a plate in for instance 7 parts, copy the lines with the number 7.

Claret Ash.

Only in Australia they have a bright pink-ruby porcelain paint "Claret ash". Delivered by Alexanders in South Australia. The name may refer to the Claret Ash tree of the genus *Fraxinus* in the olive family *Oleaceae*. These Ashes are usually medium to large trees, mostly deciduous though a few subtropical species are evergreen.. The seeds, popularly known as keys, are a type of fruit known as a samara. The inner bark of the Blue Ash (*Fraxinus quadrangulata*) has been used as a source for a blue dye. The Claret Ash or Raywood Ash (*Fraxinus angustifolia*, subsp. *oxycarpa*) turns ruby in autumn. See; <http://oregonstate.edu/dept/ldplants/froxr11.htm> See also; Pink to rubi porcelain colors.

Claret porcelain grounding.

Chelsea potteries introduced the pink "Claret" grounding in 1760. See; [Industries: Pottery, Chelsea porcelain | British History Online \(british-history.ac.uk\)](#) Afterwards it was also used on Worcester porcelain. In the first half of the 19th century it was again introduced by Coalport and Minton but now under the name "Rose du Barry" See also; Pink to rubi porcelain colors.

Clove oil.

An essential oil from the tropical tree *Syzygium aromaticum*. Synonyms; *Eugenia aromatica*, *E. caryophylla*. Cloves, leaves and the wood are used for distillation of the oil. There is only a difference in the amount of the most important substance "eugenol".

Clove oil is used in Copaiba and Fat oil for a better fluidity. Pure undiluted clove oil is toxic and etch glass, glaze and also your skin.

Cobeni.

See: Balsam of Copaiba.

COI

Center of Interest

Colours in porcelain painting.

It is not like normal painting using materials of various colours mixed with a drying substance.

In ceramic painting the colours are a result of a very complicated chemical and physical process.

In this process all the following factors play a role;

- the composition of the ceramic body,
- the composition of the glaze,
- the composition of the pigment
- the speed of heating
- the maximum temperature
- the holding time at the maximum temperature
- the cooling rate
- the atmosphere during the heating cycle; neutral, reducing or oxidizing

For example,

- a tin-based glaze painted with a copper-oxide pigment produces in a reducing atmosphere a brilliant red colour, but in an oxidizing atmosphere a green colour.
- in an oxidizing atmosphere pure-nickel-oxide pigments give on borium-based glazes light brown to yellow colours, but on borium-zinc-based glazes aquamarine to deep blue colours. On lead-based glazes violet or dark brown colours.
- in an oxidizing atmosphere chromium-oxide pigments give on lead-based glazes dark red at 900°C (1650°F) and red-green at 950°C (1740°F) and dark-green at 1000°C (1830°F) Also longer holding times makes the colour going to darker green.

Fortunately law rules for dinnerware porcelain restricts the composition of body, glaze and pigments to such an extent that under normal conditions no problems occur. But we must be careful in mixing pigments. Notorious is mixing yellow and red pigments, also painting first with yellow followed by red. Only special "mixing yellow" pigments will give fewer problems.

Cone temperature.

The temperature when a cone will bend is not only depending on temperature but also on time. So the speed of heating is a major factor for the temperature that a kiln sitter will act. Normally the temperature tables for cones are given for a heating speed of 150°C per hour.

Lowering the heating speed to 75°C per hour lowers the reached temperature by approx 20°C and increasing the heating speed to 300°C per hour will increase the reached temperature by approx 30°C. Furthermore an empty kiln will heat faster than a fully packed resulting in a small difference in temperature.

Orton mini cones.**Heating speed 150°C/hour.**

cone °C °F

020 635 1175

019 683 1261

018 717 1323

017 747 1377

016 792 1458

015 804 1479

014 838 1540

013 852 1566

012 884 1623

011 894 1641

09 923 1693

08 955 1751

07 984 1803

06 999 1830

05 1046 1914

04 1060 1940

Cooling.

See: Heating and cooling.

Copaiba-verdadeira.

See: Balsam of Copaiba.

Copaiba.

See: Balsam of Copaiba.

Copaibeura-de-Minas.

See: Balsam of Copaiba.

Copaipera.

See: Balsam of Copaiba.

Copaiva.

See: Balsam of Copaiba.

Copal.

See: Balsam of Copaiba.

Copauba.

See: Balsam of Copaiba.

Corundum.

See aluminium oxide.

Crazing.

Crazing is one of the most common problems related to glaze defects. It appears in the glazed surface of fired ware as a network of fine hairline cracks. The initial cracks are thicker and spiral upward. These are filled in horizontally with finer cracks.

Crazing is caused by the glaze being under too much tension. This tension occurs when the glaze contracts more than the body during cooling. Because glazes are a very thin coating, most will pull apart or craze under very little tension. Crazing can make food-safe glazes unsafe and ruin the look of a piece. There are two types of crazing, each with a different cause:

Immediate crazing.

Appear, when piece removed from a kiln or shortly thereafter caused by size changes during firing. Glazes are designed to shrink less than the body which puts them in compression, make them stronger, and make them less susceptible to crazing.

Delayed crazing.

Shows up weeks or months later, caused by moisture getting into ware. This type of crazing shows up weeks or months later and is practically always caused by under-firing. If ware is under-fired (does not reach maturity), it can in time expand when moisture fills the pores causing the body to expand.

Crystobalite inversion.

See: Silica inversions.

Cupayba

See: Balsam of Copaiba.

D

D-Limonene

Limonene is a chemical found in the rind of citrus fruits, such as lemons, limes, and oranges. It is especially concentrated in orange peels, comprising around 97% of this rind's essential oils (2). It's often referred to as **d-limonene**, which is its main chemical form. It is used as a brush cleaner and replaces Grumtine for those who used this now "no longer available" brush cleaner.

Delft's blue

The only left 17th century pottery in Delft the Netherlands. See: <https://royaldelft.com/en/>

Denatured alcohol.

See: Methylated spirits

Dichroic glass.

Glass coated with ultra thin layers of metallic oxides produced in a high temperature vacuum furnace. The metallic oxides are vaporized by an electron beam and the glass is coated with ultra thin layers. The resulting color is determined by the

individual oxide and the coating thickness in the order of 700 angstroms. Such coatings transmit certain wavelengths of light, while reflecting others, thus creating an interference-effect. In fact the optical effects of dichroic glass can be compared with the effect of lusters by which also very thin layers are applied on the porcelain surface giving interference effects. In the production of dichroic glass all kind of metal oxides and combinations of them can be used.

Dicköl.

Synonyms: Essence Grasse, Fat Oil, Thick oil.

Turpentine will thicken by evaporating volatile components by putting it on a warm place. Pure spirit of gum turpentine will become fat oil by evaporation.

Dust and hairs in paint.

The best practice is preventing that dust will fall into the paint or wet painting. Keep paint

in closed containers and place the painting upside down when not working on it.

To pick up hairs or large dust particles in wet paint use a small peace of beeswax on a

stick. Also the tacky stuff that is used to stick posters to the wall or a kneaded eraser can

be used.

A very special method is used by experienced professional painters using Copaiva balsam

with clove oil to paint. They let large paintings completely dry and use very fine sanding

paper (600 mesh) to remove the dust particles just before firing and they fire large tile

vertical to prevent that dust from the kiln fall upon the tile.

E

E 6000.

Adhesive manufactured by Eclectic Products is headquartered in Eugene, Oregon and has a manufacturing facility in Pineville, Louisiana.

Adhesive used with porcelain. An example would be to glue the metal hinges to porcelain boxes.

Earthenware

Earthenware is one of the oldest materials used extensively for pottery, tableware and decorative objects. Although body formulations vary tremendously between countries, and even between individual makers, a generic composition is 25% ball clay, 28% kaolin, 32% quartz, and 15% feldspar. While red earthenware made from red clays is very familiar and recognizable, white and buff coloured earthenware clays are also commercially available.

Earthenware is typically bisque (or "biscuit") fired at a temperature of around 1000 to 1150°C (1800 to 2100°F), and glaze fired (the final firing) at around 950 to 1050°C (1750 to 1925°F). Higher firing temperatures will generally cause earthenware to crack. After firing the body is porous and opaque with colours ranging from white to red depending on the raw materials used. Modern earthenware may sometimes be as thin as bone china and other porcelains, though it is not translucent and is more easily chipped. Earthenware is also less strong, less tough,

and more porous than stoneware - but its low cost and easier working compensate for these deficiencies. Due to its higher porosity, earthenware must usually be glazed in order to be watertight. Bisque earthenware absorbs up to 10% water and when moist not freeze resistant.

See also; Ceramics.

Elmers white glue.

Old fashioned all purpose glue manufactured by Elmers Products Inc. (www.elmers.com) Columbus Ohio. Used in repair paste for porcelain. See; Repair paste. Also used in holding a hard to hold piece and to set them inside the kiln. This glue will fire off.

Erasing gum bullet.

Mix a two components epoxy resin or silicon rubber with as much as possible siliconcarbide grinding or polishing powder and let it harden. For rough grinding use a mesh size 80-120, for fine grinding use a mesh size 200-300, for polishing use a mesh size 800-1200. Grinding powders can be obtained in a lapidary supply shop. The "rough"one is very good for erasing violet stains from gold on porcelain. The finer ones are good for polishing gold on porcelain or your jewelry.

Essence Grasse.

See: Dicköl.

Essential oils.

Essential oils are aromatic oils obtained by steam or hydro-distillation of plants. Different parts of the plants can be used to obtain essential oils, including the flowers, leaves, seeds, roots, stems, bark, wood, etc. Due to the high concentration care must be taken to handle undiluted essential oils. Some of the undiluted pure oils might be dangerous for your health. Only a few are used for porcelain painting, like; Rosemary, Anis, Lavender, Clove. Of which Rosemary is the least harmful.

Etchall.

Etching paste containing ammonium-fluoride. Use gloves and good ventilation. See health aspects.

Ethanol.

See: Methylated spirits.

Eugenia aromatica.

See: Clove oil.

Eugenia caryophylla.

See: Clove oil.

Eugenol.

See: Clove oil.

F

Faience.

Glazed earthenware made in ancient Egypt, where it was used for beads, amulets, jewelry, and small animal and human figures, most notably the blue-glazed hippopotamus figures. Faience tiles were used to decorate the walls of the subterranean chambers of the pyramids. Polychrome tiles with floral designs were used in houses and palaces.

Tin-glazed earthenware made in France, Germany, Spain, and Scandinavia, similar to Faenza majolica, for which it was named. Villeroy&Boch make faience dinnerware; Burgenland blue and red, Old Strassburg and Wild Rose.

Fat Oil.

See: Dicköl.

Firing.

See: Heating and cooling.

Firing old ceramics.

Normally all ceramic items have always a small area that is not glazed. Old ceramics will have absorbed some water or other fluids. The amount depends on the grade of sintering.

Stone- and earthenware articles are very porous. Porcelain is much more sintered. But cheap low grade porcelain will also absorb fluids over a long period of time.

When firing old ceramic items you need to know the sintering grade, because the smallest amounts of water or any other fluid absorbed will evaporate with an enormous increase in volume and break the item.

As you probably not know the sintering grade of the ceramic, be safe and use always a drying period of an hour for stone- and earthenware and 15 minutes for porcelain at 120 C (248 F).

Only top quality porcelain and bone china are so highly sintered that no fluids will be absorbed and do not need a drying period for re-firing.

Furthermore old items might have hairline cracks you do not see. When firing too fast, hairline cracks might propagate and give a fracture. So heat and cool slow, preferably less than 200 C (392 F) per hour.

Flux.

There are two main groups of fluxes, the original (old) fluxes are based on the toxic lead silicate the newer fluxes are based on borium silicate. Both groups lower the melting point of the glaze surface resulting in more shine. Also in the porcelain paints is always a small amount of flux to ease the reaction of the stains in the paint with the glaze. Adding a tiny bit of extra flux to the paint can give some more shine but generally one takes too much and the colour changes or disappears.

A lead free flux can easily be made from 38 gr Borax (hydrated sodium borate $\text{NaB}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$) plus 10gr Quarz (SiO_2)

Focal point.(Focus, FP)***In optics;***

The point at which initially collimated rays of light, meet after passing through a convex lens or reflecting off of a concave mirror.

In mathematics;

A critical point of a distance function.

In an antenna;

The driven element, directly connected to the transmission line or source

In game theory;

An equilibrium more likely to be chosen by the players because it seems special, natural or relevant to them.

In daily conversation;

A centre of interest.

In art; (Porcelain painting)

The centre of interest in an artwork that attracts the viewer's eyes first. The focal point may stand out because of its size, the brightness of its colour, the use of contrasting colours, particularly light against dark, or because the components of the painting have been arranged so as to guide the viewer's eye. Generally, it's best not to knock viewers over the head with your focal point. A little goes a long way, and something simple like a colour change can often do more than complex visual acrobatics.

Frit.

Frit is ceramic chemicals that have been melted together as a glass and ground to a fine powder. The purpose is to render soluble materials insoluble for workability and stability in glaze and clay formulas. Frits are always used as a flux in a formula even though they also contain percentages of alumina and silica in combination with common flux materials.

Fürstenberg porcelain manufactory.

Still working porcelain manufactory with a large museum. See;

<https://www.fuerstenberg-porzellan.com/en/home/>

G

Glazes.

See; Ceramic glazes.

Glycerin.***(Glycerine, Glycerol, Glycylalcohol, Glyceritol, Trihydroxypropane, Propanetriol)***

Glycerin, $C_3H_5(OH)_3$, is an alcohol with three hydroxyl groups that are responsible for its solubility in water and its hygroscopic nature.

In porcelain painting it is widely used in water based mediums as a thickening agent. In foods and beverages, glycerol serves as humectant, solvent and sweetener, and may help preserve foods. It is also used as filler in low-fat food products, and as a thickening agent in liqueurs. As a food additive, glycerol is also known as E number E422. It is found in cough syrups, elixirs and expectorants, toothpaste, mouthwashes, skin care products, shaving cream, hair care products, and soaps. Glycerin is also highly "hygroscopic" which means that it absorbs water from the air and it would become 80 percent glycerin and 20 percent water. Because of this hygroscopic quality, pure, 100 percent glycerin placed on the tongue may raise a

blister, since it is dehydrating. Diluted with water, however, it will soften your skin.

Danger of contamination with diethylene glycol.

The US Food and Drug Administration advised to test all batches of glycerin for the toxic diethylene glycol. This follows an occurrence of 100 fatal poisonings in Panama.

Glycol.

(Ethylene glycol, monoethylene glycol, MEG, ethane-1,2-diol)

Glycol, $C_2H_4(OH)_2$, an alcohol with two hydroxyl groups is an odorless, colorless, syrupy liquid with a sweet taste. Ethylene glycol is toxic, and its accidental ingestion should be considered a medical emergency

The major use of ethylene glycol is as a coolant or antifreeze in, for example, automobiles and personal computers. Due to its low freezing point, it is also used as a deicing fluid for windshields. It is used as an ingredient in shoe polish and also in some inks and dyes.

In porcelain painting it is widely used in water-based painting mediums.

The major danger from ethylene glycol is following ingestion. Due to its sweet taste, children and animals will sometimes consume large quantities of it if given access to antifreeze. If one has ingested ethylene glycol, give the person an alcoholic beverage while the paramedics arrive. Ethanol acts as a competitive inhibitor to the active site of the enzyme that converts ethylene glycol to its toxic metabolites. Once ethanol binds, the ethylene glycol is harmlessly excreted out of the body. Ethylene glycol poisoning is a medical emergency and in all cases a poison control center should be contacted or medical attention should be sought. It is highly toxic as little as 30 milliliters (2 tablespoons) can be lethal to adults.

So be careful with so called harmless water-based painting mediums.

Gold

Already in ancient times pure gold and mercury gold were used for all kind of decoration.

Pure gold.

KPM Berlin made gold decorations on porcelain in the 18th century using a mixture of honey and gold powder painted on porcelain and subsequently fired. This so called Honey Gold is

the most beautiful gold giving no purple halo. Disadvantage was that Honey Gold is fragile. Later mixtures of gold powder with borax and lead silicate fluxes were used for gilding glass,

ceramics and porcelain. Now lead-free porcelain paint fluxes are used with good results.

Mercurygold or Gold amalgam.

Also widely used for all kind of gilding was mercury gold, an intermetallic compound of gold and mercury melting just above room temperature and decomposing at 360EC.

A disadvantage of gilding with mercury gold is the high toxicity of mercury. Furthermore the forming of a purple halo around the gold when fired on glass, ceramics or porcelain.

Gold paint for glass and porcelain.

There are various types of gold paint.

Liquid bright gold (~12% Au).

After firing resulting in a shiny layer of gold.

Liquid burnishing gold (~17-24% Au).

After firing resulting in a matt layer of gold.

Roman (burnishing) gold (~35% Au).

There are two types, both resulting in a matt layer of gold;

* Un-fluxed.

This needs a surface prepared with a flux to prevent being rubbed off after firing.

* Fluxed.

This does not require a prepared fluxed surface and can be applied directly to the fresh china surface.

Gold painting on porcelain.

You can paint gold over green and all other colours without having a crackling effect.

Just never fire warmer than 760°C. Katrien Puech

Using gold paints must be done with extreme cleanliness to obtain good results.

* Use new brushes and keep them exclusively for gold.

* Do not mix the gold paint with other paints or painting mediums.

* Use only gold paint thinner or high purity Lavender oil.

* Clean brushes in Lavender oil.

* Clean the porcelain with pure alcohol or acetone.

* When mixing Roman gold with a thinner, use a horn, nylon or plastic spatula not a metal.

* Apply gold separate before the latest fire.

Reasons for dark spots on the gold after firing.

- Dirty surface (dust, fatty fingerprints, wrong cleaner)

- Contamination with other paints from dirty brushes

- Contamination with turpentine from wrongly cleaned brushes

- Use of raise paste for liquid bright gold or liquid burnishing gold

- Application of gold paint on unfired base for gold or raise paste

Reasons for contraction of the gold-layer (that might result in crazing);-

- Too fast drying before firing (forced heated air drying)

- Too thick paint or layer of paint

- Too fast firing in the temperature range where decomposition of organic components take place.

Reasons for disappearing of the gold.

* Firing at too high temperature.

* Too long holding time at maximum temperature.

* Painting on a copper containing base.

When you still have problems;-

- Read the rules for painting gold on porcelain again and again

- Clean carefully (e.g. with pure Acetone)

- Use one layer of paint (thin old paint to the right thickness)

- Dry at room temperature (no forced drying)

- Heat slowly up to approx 400°C. (let ventilation hole open)

- For all other information go to this site prepared by Gene Patterson:

<http://www.porcelainpainters.com/goldhome.html>

Also: all about gold by Sol Labos: [All-about-gold Sol Labos Brien 2021.pdf](#)

Gold banding hint.

To get a perfect band of gold on the bottom when you have had enough caffeine to make the hand shake use the auto detail or striping tape that you get from the professional auto paint shops or sometimes at auto parts shops. 3M makes one that is two parallel strips with a 1/8 " space in between the stripes. Put the tape where you want the gold, remove the clear plastic covering the middle space, and apply gold there. Make sure to press the tape down really good as you don't want the gold to seep under the tape. Let it dry somewhat and remove the plastic striping tape. This plastic tape will stretch a little so you can gently "encourage" it to fit whatever.

Gold-based porcelain paint.

Those paints are expensive but give a very bright ruby colour. Adding a drop or touch of gold to ruby will give a more intense colour.

Gold stains.

To remove the violet gold stains cover the stain with an iodine-alcohol or water soluble povidon-iodine (polyvinylpyrrolidone-iodine PVP-I) solution for 1-3 minutes and rinse with water. For heavy stains repeat the iodine etching. The great advantage of iodine etching is that it don't attack the glaze so it stays shiny. Both the normal iodine tincture and Betadine from the pharmacy work excellent. Etching with the very dangerous Whink or the somewhat less dangerous Etchall will attack the glaze too and make it dull. Also grinding will leave grinding marks.

Gold burnishing sand:

Lapidary shop, ask for Ceriumoxide polishing powder <0.1micron.

That is the best polishing powder you can get.

Use a dry soft cloth with a little bit of ceriumoxide powder and rub over the gold and it will shine fantastic.

Gold leaf and application:

Do you want to use real 23K gold leaf (leaf form)? or Roman gold? I have fired 23k gold leaf on porcelain, but not on glass. You can use a grounding oil, let it dry to a tacky consistency, lay the gold leaf on, press it on so that it all adheres, remove excess, and then fire it just like you would Roman gold. If you have specific questions, let me know.

Gold Colors:

To mix gold colors that are granulated, The product is Eucerin lanolin. Mentioned it at The Art Institute a few years back. I found some at walmart in the baby goods dept. I know that walgreens and the vitamin cottage also carry it. I have had success using it, I put a pea sized pile of paint (that was mixed with mineral oil) on a tile and add a dab of lanolin that is half that size and mix well with your palette knife. I only add it to the paint I am using at the moment---

Another tried and true solution to grainy gold based colors is to mix in a drop of liquid bright gold to the paint.

Graphite pencil.

Used to draw designs on porcelain. It will adhere to the porcelain better if the porcelain is wiped first with turpentine and allowed to dry. Use a graphite 9B best as per Joerg Kugelmeier.

Graphite Paper.

This is a black waxy type of paper that contains the same thing that is in an every day pencil -graphite. Place the waxy side down to transfer designs from a line drawing. The best paper and thinnest is the Aquabee graphite 17001824. Note that Saral's red graphite paper leaves some traces on the porcelain and is not recommended for portraits.

Grounding :

- wet grounding :

classic sponge grounding. That is to say: pigments + medium + lavender and pounced evenly with a sponge.

-dry grounding : start by pouncing only the medium evenly and without lavender. When it starts to be almost completely dry, barely sticky, sprinkle the pigment over the entire surface and spread it evenly with a piece of cotton wrapped in a piece of silk fabric.

Grumtine.

Original formula **Grumtine** is a strong, effective, finest quality oil painting medium and solvent for cleaning brushes with the pleasant fragrance of natural orange rind. More effective than turpentine as a thinner and in the preparation of mediums. Unfortunately this product is no longer available or has become very rare to find. It is replaced by d-limonene.

H

Hair for Brushes.

The 15000-20000 year old cave paintings of Altamira and Lascaux were already painted with brushes made of animal hair connected to sticks!!!

The hair is the most important part of the brush.

Generally animal hair remains superior in almost all cases because of its better paint absorption. The various types of hair give each brush its own unique character.

Commonly the softer sable and squirrel hair are used for on-glaze porcelain painting. The squirrel for general use, the sable for the finer details.

The more abrasion resistant polecat, ox and hog hair are used for under-glaze painting. The polecat hair for the finer details. The ox-ear hair for lining and the hog hair for larger areas. For majolica painting in raw glaze, ox-ear hair brushes are shaped in such a way that only one hair is used to make the fine lines. The body of the brush contains the paint.

But it depends on one's own aims, requirements and preferences what brush is most suitable.

Brushes with mixed hair combine the properties of different kinds of hair.

-Kolinsky red sable hair.

The tail of the kolinsky sable living in Siberia and Mongolia provides the best quality hair for brushes. This hair ensures excellent paint absorption, excellent resilience and long life.

-Pure red sable hair

Brushes made of red sable hair also show excellent paint take-up, fine resilience and a long life.

-Squirrel hair.

Synonym; Petit gris pur.

The Russian or Canadian squirrel tail provides hair which excels with its softness and paint take-up.

-Synthetic Hair.

Synonyms; Selected filament, Synthetic polyester fibers.

Due to the scarcity of sable synthetic hair has been developed with virtually the same properties as sable, but at a more attractive price. But the paint absorption capacity is lower than that of sable. The resilience and resistance to wear are as good as that of sable.

-Iltis.

Synonym; Fitch hair, Polecat hair.

The Russian iltis polecat tail provides hair which has a great capacity for taking up paint, is highly abrasion resistant and unusually resilient. The hairs can be set perfectly in a fine shape.

-Ox(-ear) hair

This hair is generally used as a cheap alternative to red sable. The hair features good take up of paint, is reasonably resilient and has a long life.

-Chunking

Comes from hogs living in the Chinese province of Chungking. This hair is extremely flexible and resilient and has a very high paint take-up and is extremely abrasion resistant.

-Hog bristle

Hog hair is reasonably stiff and features a good paint take-up and abrasion resistance.

Health aspects and safety precautions in china painting.

There is a lot of mis-understanding about health aspects and safety precautions in china painting.

-Toxicity of china painting powders.

Not only lead and cadmium containing china paints are toxic, all are more or less bad for your health. Do not inhale powders, do not eat during painting and wash your hands after painting.

Most western countries have required that paints containing high levels of lead or cadmium to be banned or lessened in the mix to acceptable levels. Do not use old paints. They have much higher levels of toxicity than the new ones. There are new lead free paint being offered by some china companies. The same for flux. The old ones are based on the toxic leadsilicate. The new ones are based on the less toxic boriumslicate. So check which type of flux you are using.

-Toxicity of china painting mediums.

Only pure balsam of Copaiba is not toxic and gives no allergic reactions. Pure turpentine oil is not toxic but a lot of people are allergic for it. Also some do not like the smell. Water-base painting mediums suggest to be safe but in most cases they contain glycols and those are also bad for your health. Essential oils are extremely concentrated and might be very toxic. We all use thyme (thymus vulgaris) in our kitchen but thyme oil is toxic due to the high concentration. Industrial citric oils might contain fungicides, insecticides and ripening agents. Only the special types for

the food industry are safe. See "The essential oils, by Julia Lawless, Element books Shaftesbury Dorset England". Check for certification labels on them to insure the user that they have been tested and are within acceptable levels.

-Toxicity of precious metal paints and lusters.

Precious metal china paints and lusters are toxic organic compounds.

-Toxic fumes from firing painted china.

The exhausting fumes during firing painted china are toxic, especially those from precious metal paints and lusters. Do not stay in the same room when firing at any time. Do have adequate ventilation and if possible install a venting system near the kiln.

-Etching china with hydrofluoric acid or ammonium fluoride or other fluor components.

Hydrofluoric acid is the most dangerous acid even in low concentrations. Using Hydrofluoric acid is very dangerous, Latex or household gloves are not safe enough, you need special gloves, a face mask and a special exhausting cabinet for the vapour. In case of contact with your skin directly apply lots of calcium gluconate gel (2 or 3 %) at least for 2 hours.

It harms your lungs terribly, it goes through your skin and bones and the wounds heal slowly. The fluor ion attacks the calcium balance in your system giving delayed heart problems.

And all that risk for a lousy piece of porcelain. Be wise and take a new piece of porcelain and paint again. When you can paint it once you can do it again. When you harm your lungs or hands you can not replace them. Furthermore look at the following site for deadly accidents with HF.!

<http://www.safetyline.wa.gov.au/pagebin/injrsign0079.htm>

Ammonium fluoride is much less dangerous but still you have to take care.

Hydrofluoric acid, in pure form, is banned in the U.S. as far as being able to buy it over the counter. It used to be used to etch china, but it can not be bought by individuals now and can only be used in industrial situations by professionals.

However, small amounts are still in a product like "Whink" and rust removers, and also in "China Eraser". In "Etchall" the active compound is ammonium fluoride.

Health aspects of using painted china as dinner ware.

Only original dinnerware afterwards painted with lead and cadmium free china paint (no lusters !!!) and fired above 800°C is safe for use with food. Precious metal china paints are safe after firing, but lusters not !!!

-Safety precautions for China painting with children.

Be very careful to let children paint china. Never let them mix the painting powders. Keep them under your sight for every second. !!! Only with wise parental or teacher guidance children can safely use paints and supplies for painting on china.

When you like to have fingerprints or hand prints on a plate use pure honey, without any paint to make the print and afterwards do it your self to powder that print with paint.

Heating and cooling.

In painting high quality porcelain plates the firing seldom give problems. But complex shapes, thicker, lower quality, unknown ceramics, might give serious problems. A general advise is take your time, you spend many hours in painting why firing as fast as possible to ruin your work.

A number of factors are involved.

-Thermal stresses in complex shapes and great difference in thicknesses when heating or cooling to fast (> 200°C per hour)

-Cristobalite inversion (phase transition) in silica containing materials give a 2.5% volume change. Heating and cooling to fast (>200°C per hour) can give to high stresses and fracture.

-Quartz inversion (phase transition at 573°C) give a 1% volume change. Heating and cooling to fast (>200°C per hour) can give to high stresses and fracture.

-Free and crystal bound water can give steam forming and to high stresses and fracture. Slow heating and a holding time at approx 120°C and 360°C is needed to remove all the water.

-Evaporating and burning the painting medium needs also some time and ventilation. Poor ventilation might influence the colours of the painting.

-The vapours of lusters are famous for discolouring paintings.

Heating wires for kilns.

As heating wires for our kilns generally **"Kanthal"** (70% iron-25% chromium-5% aluminium) or **"Nikrothal"** (45% iron-35% nickel-20% chromium) alloys are used. The new, fine crystalline, wires are ductile and can be spirallized. After long term use at high temperatures crystal growth will take place and make the material brittle. This is irreversibly.

Every heating to high temperature will make the wires more brittle and shorten the life time. See;

<http://www.kanthal.com/sandvik/0971/internet/s003237.nsf/html/Startpage?opendocument>

Henneberg porcelain.

Graf von Henneberg, Am Eichicht 1, D-98693, Ilmenau, Germany.

See; www.graf-von-henneberg.de

Heraeus.

Ceramic pigments and precious metal porcelain paints and lusters. See; www.wc-heraeus.de

Hutschenreuter porcelain.

Hutschenreuter Platz, D-95100, Selb, Germany.

See; www.rosenthal.de

Hydrofluoric acid.

This is one of the strongest and most dangerous acids. See the thread "Health aspects and safety precautions" Also go to the following site;

<http://www.safetyline.wa.gov.au/pagebin/injrsign0079.htm>

Hydrofluoric acid.

This is one of the strongest and most dangerous acids.

Using Hydrofluoric acid is very dangerous as latex or house hold gloves are not save enough, you need special gloves, a face mask and a special exhausting cabinet for the vapour. It harms

the lungs terribly, it goes trough the skin and bones and the wounds heal very slowly. In case of contact with your skin directly apply lots of 2-3% calciumgluconate gel at least for

2 hours and go to a hospital. Tell them that the fluor ion attacks the bloodcalcium and might give dangerous delayed hearth problems. Let them look at the following website for deadly

accidents with HF. <http://www.safetyline.wa.gov.au/pagebin/injrsign0079.htm>
See also the special file "Health aspects and safety precautions"
Also go to the following site;
<http://www.safetyline.wa.gov.au/pagebin/injrsign0079.htm>

I

Incising paste.

A paste is applied to the porcelain or other glazed surface and covered with a specific type of glass beads that cause the glaze surface to crack and chip off during the cooling process, exposing the body of the clay. Liquid bright gold, lustres, metallics etc can then be applied and fired to give assorted etched effects and patterns.

Iodine.

Iodine is a well known halogen widely used for disinfection purposes. In porcelain painting it is used to remove purplish gold stains. See; Gold stains.

I-relief.

A structure/texture paste, can be mixed with a variety of solutions: oil or water-based mediums, milk etc to a consistency thick enough to hold its shape. It can be applied with a stylus, brush, sponge, satay stick, syringe etc to obtain a wide variety of effects. It matifies liquid bright gold when this gold is applied over I-Relief that has been fired.

J

Japanese Ceramics.

-**Yaki** is the Japanese word for porcelain, pottery and earthenware.

-**Sometsuke** is the general term for porcelain in white and under-glaze blue.

-**Kyushu island** is the centre of the Japanese porcelain industry.

-**Imari** is the name of a port near Arita on the island Kyushu. Today the word Imari has become a synonym for Japanese porcelain in general.

-**Ko-Imari** is the name of a style of polychrome enamel with characteristic five colour glazes with gold and silver painted on cobalt under-glaze bodies. The different styles in Imari ware are named after the region where they are produced or after the potter families who had invented the style.

-**Arita** is the name of the largest city on Kyushu island. Arita porcelain is best known as "Arita blue and white", characterized by a typical under-glaze blue and elegant lively patterns.

-**Kakiemon** is also produced in the Arita area. This line of porcelain goes back to its founder, Kakiemon I (ca. 1596-1666) of the Sakaida family. Kakiemon I is considered to be the first to produce porcelain with enamel techniques and overglaze colours in Japan. Kakiemon comes primarily in square, octagonal or hexagonal shapes. Typical colours for Kakiemon are red, light blue, yellow and blue-like green colours.

-**Fukugawa**, Also the Fukugawa family produced porcelain in the Arita region since the seventeenth century. Fukugawa comes in a wide variety of designs and colours. Characterized as a combination of traditional Japanese designs with western style

elements

-Kutani was a leading porcelain centre in the Ishikawa Prefecture since the seventeenth century. Early Kutani is characterized by green and brown colours. Later Kutani has bright colours in green, blue, aubergine, yellow, orange, black and gold.

-Satsuma is something between porcelain and pottery. Satsuma originates from the seventeenth century. The prince of Satsuma in the Southern area of Kyushu Island had established a kiln with the help of Korean potters. Satsuma from this time was made of brown clay. In the late eighteenth century Satsuma was so popular that clay from the Kyushu Island was brought to Awata near Kyoto to produce Satsuma, now known as Kyoto Satsuma. The characteristics of Satsuma are rich decorations with gold and polychrome colours on a soft, ivory-coloured, crackled glaze. Typical for the decoration of Satsuma is the use of a highly saturated blue glaze.

-Banko pottery have been produced since the nineteenth century and comes usually as teapots with charming designs of a peculiar style. Some Banko pottery is unglazed while others can be very colourful and decorated with sculpture-like high reliefs in very imaginative shapes.

-Sumida pottery is a heavy, brightly glazed pottery and often has human and animal figures as reliefs. This pottery has its name from the Sumida river in an area near Tokyo.

-Kenzan is a style founded by Ogata Kenzan (1663-1743), a poet, potter and painter.

-Nabeshima is a very rare and expensive porcelain. Until the Edo period it was not sold on the domestic market and reserved for export and use by the Nabeshima family and the noble classes. Nabeshima wares are finer and thinner than normal Arita ware.

-Hirado porcelain was not allowed for sale on the domestic Japanese market. Hirado is mostly found in milky white and under-glaze blue colours.

Jesuit's balsam.

See: Balsam of Copaiba.

Jojoba oil.

Jojoba (*Simmondsia chinensis*) is a perennial woody shrub native to southern Arizona, southern California and northwestern Mexico. Native Americans extracted the oil from jojoba seeds to treat sores and wounds centuries ago. Today 40,000 acres of jojoba are under cultivation in the southwestern U.S. The oldest commercial jojoba plantings in the U.S. were established in the late 1970s, and present production of jojoba oil is in the range of thousands of tons per year. The major world producers are the United States, Mexico and Australia

See; <http://www.mountainroseherbs.com/bulkoil/bulkoil.php>

and; <http://www.rirdc.gov.au/champions/JojobaScience.html>

K

Kahla porcelain manufactory.

Christian-Eckardt Strasse 38, D-07768, Kahla, Germany.

See; www.kahlaporzellan.com

Kämmer porcelain manufactory.

Rudolf Kämmer, Breitscheidstrasse 98, D-07407, Rudolstadt Germany.

See; www.porzellankaemer.de

Kang Hsi.

Emperor from the Ming dynasty. Porcelain with a blue/white design

Kanthal.

Approx. 70% iron- 25% chromium- 5% aluminium alloys used for heating wires up to 1300-1400°C. (2370-2550°F). After long term use at high temperatures crystal growth occurs making the material brittle. See also "Heating wires".

Kiln wash.

Synonym; Bat wash.

To prevent sticking glazed porcelain or glass objects to the kiln support plates high melting point minerals are used as a kiln wash. Generally used minerals are: Magnesium oxide (MgO) with a melting point of 2800°C, Aluminium oxide (Al₂O₃) with a melting point of 2050°C, Magnesium-Aluminium oxide (MgAl₂O₄) Spinell with a melting point of approx 1950-2150°C depending on the exact composition. The minerals are mixed with some water and brushed over the plates and dried. The remaining powder prevents adherence of glaze or glass.

Kiln ventilation.

See: Heating and cooling.

L**Lavandin oil.**

See: Lavender oils.

Lavender oil.

See: Lavender oils.

Lavender oils.

The lavender family Lamiaceae (syn. Labiateae) has over twenty species that are mostly of Mediterranean origin. There are three main species producing lavender, lavandin and spike oils.

True lavender oil is derived from *Lavandula angustifolia* (syn. *L. officinalis*).

Lavandin oil is derived from a hybrid of *angustifolia* and *latifolia*. (*L. hybrida*, *L. hortensis*).

Spike oil is derived from *L. latifolia* (syn. *L. spica*).

The traditional extraction of the oils is done by steam distillation of the flower heads.

The industrial solvent extraction is done with the whole top sections of the plants.

The main components of the oils are;

Lavender;

Caryophelene 3-12% , Linalool 30-50% , Linalyl acetate 30-45% .

Lavandin;

Camphor 5-10% , Cineole 5-10% , Linalool 30-40% , Linalyl acetate 20-30% .

Spike;

Camphor 20-30% , Cineole 20-30% , Linalool 40-50% , Linalyl acetate <15% .

LBG .

See: Liquid Bright Gold.

Leach ability of lead and cadmium.

If the surface passes the standards set by the Food and Drug Administration (FDA), then it may be used on food contact areas and can be labeled as dinnerware safe. Glazes fall into the following categories.

* **Non-Toxic:** Refers to the product in the jar. Contains no harmful ingredients in sufficient quantities that could be harmful to humans.

* **Health Caution:** Refers to the product in the jar. There are some ingredients present in large enough quantities that the product may be harmful to humans. More detailed information is available on the relevant Material Safety Data Sheet (MSDS).

* **Dinnerware Safe/ Food Safe:** Refers to the finished, fired surface of the glaze. Once fired according to the instructions on the product label, the fired surface may be used in contact with food or beverage without leaching potential harmful elements from the glaze into the food or beverage.

In principle those rules must also be followed for porcelain paints and painted products.

Leaching test

All glazes leaches to some extent when it comes into contact acids in our food, especially if the contact occurs over a period of time or the acid is hot. The ability of the glaze to pass two simple tests can be an indication that it will be food safe.

Dishwasher Test: Take two identical items and put one in the dishwasher for two months. Compare the surfaces of the two very closely. If the washed one looks any different, either in color, gloss, or texture then you have a soluble glaze.

Vinegar Test: Take an item and put it in a container half full of vinegar and leave it for several days. Dry the item and compare the color and gloss of the surface above and below the liquid line. Any difference indicates that the glaze is subject to leaching.

Lead poisoning

Long-term exposure to low levels of lead may result in the gradual accumulation of lead and the development of a number of disorders and diseases, including learning and behavior problems, cardiovascular and kidney diseases, decreased fertility, hypertension and cancer. The maximum allowed lead level for adults is 10 microgram per deciliter of blood.

See: <http://www.lead.org.au/fs/fst7.htm>

For those who like to know how lead in the blood can be tested see the Website of ESA in Chelmsford MA. Their test kit needs two drops of blood and gives the answer in 3 minutes.

See: http://www.esainc.com/products/type/systems/clinical/lead_poisoning/leadcare

Line Drawing.

A line drawing is a black & white copy of a drawing of a study. This is used to copy from. You can place the line drawing directly on the china and place graphite paper under it with the greasy side down toward the china and then use a ball point pen or stylus to transfer the drawing onto the china. Or, you can first trace the line drawing onto tracing paper or acetate paper and then place this on your china and again use the graphite or saral to transfer the design.

Liquid Bright Gold

For all information on gold, see;

<http://www.porcelainpainters.com/goldhome.html>

Lusters.

The application of very thin metallic layers on porcelain was already used in the 8th century in Persia. Via Egypt and the African coast it was in the 13th century introduced in Spain as

Hispano-Moresque earthenware. About 1600 it was used in Italy as Maiolica-Deruta. In 1800 it was used in England by Wedgwood. Platinum, Gold, Silver and Copper are dissolved in acid and with an oily medium painted on glazed ceramics and fired to obtain a thin iridescent metallic film on the surface. Platinum gives a silver color, Gold a ruby, Silver a straw color. Copper depending on furnace atmosphere and temperature, glaze composition and layer thickness a greenish up to a bright copper color. Do not use lusters for dinner ware, see also safety and health precautions.

M

Majolica.

Originally earthenware covered on the front with an opaque white tin-glaze and on the back with an transparent lead-glaze and decorated in the raw glaze with only the oxides of cobalt for blue, copper for green, cadmium for yellow, manganese for brown and iron for red. Newer techniques and materials brought the quality and designs of the original house hold majolica to the highest level of brilliantly glazed and decorated ceramic.

For more info see: <http://majolicasociety.com/>

Mal-dos-sete-dias.

See: Balsam of Copaiba.

Marble imitations on porcelain.

In old castles and buildings painted marble on wood is often so real that you have to knock on it to hear that it is wood and not marble.

Porcelain painters also imitate marble for backgrounds and borders on plates. As there are many types of marble only some general rules can be given.

- * cover the whole plate with a light base color and also a very little darker one.
- * use a large flat brush and load the two colors on both sides of the brush and make large irregular strokes to cover the whole plate
- * fire the plate
- * choose darker colours with the same method to make the marble patterns
- * use a wipe-out or dry brush to make light veins in the marble patterns and make also some very small irregular light spots in the marble patterns with a tooth pick
- * fire the plate
- * fill the light spots with an irregular touch of burnishing gold (no round points of bright gold)
- * fire the plate To paint a marble border one must realize that the veins in the marble do not go radial to the centre of the plate.

Matidiguate.

See: Balsam of Copaiba.

Matisihuati.

See: Balsam of Copaiba.

Matt glazes.

Matt glazes are made by additions of Zinc oxide, Titanium Oxide, Calcium carbonate Talcum, Strontium carbonate. A waxy matt surface is obtained by addition of 5% Titanium oxide plus 5% Tin oxide. This mixture can also be used on a glazed surface as titanium oxide in higher concentrations acts as a flux.

Mediums for porcelain painting.

Synonyms; Painting medium, Painting oil.

In principle any non toxic sticky fluid that burns completely without leaving remains on the surface can be used for painting. Some teachers have their own secret formula. But do not forget its not the painting medium or the special brushes that make the painting, its your own skill and nothing else. Over the many years that porcelain painting is done some painting mediums are still used by the famous porcelain manufacturers all over the world. Those are Copaiba and Fat oil.

New are so called water-base mixtures of sugar, dextrose, Arabic gum, glycerin, (poly)glycols and (higher)alcohols. Those should be less toxic but the paints added to the medium are extremely more toxic, so this is wrong point of view.

Meissen Porcelain factory.

Talstrasse 9, D-01662 Meissen, Germany

www.meissen.de

Methanol.

See: Methylated spirits.

Methylated spirits.

Synonym Denaturated Alcohol.

Composition; 95% ethyl alcohol and methyl alcohol. (Often coloured and with addition of a strong odour.) Ethanol burns with a hot, pale-blue flame. It is miscible with water. Uses include consumption in alcoholic beverages, a solvent, an anti-freeze solution, and a fuel. Ethanol is used as an additive to car fuel and is burnt with liquid oxygen in some rocket engines. When Ethanol is burnt in air, the results of combustion are carbon dioxide and water.

Methyl alcohol, or methanol, is also sometimes called wood spirit. It is produced by the destructive distillation of wood, or by a synthetic process which involves reacting carbon monoxide with hydrogen gas. Methanol burns with a pale, non-luminous flame. It is poisonous and, if consumed, causes blindness, insanity, and eventual death. It is commonly used as a denaturant for ethyl alcohol, and is miscible with water.

Uses: Removing paint, dust, debris, fingerprints and etc. from painting surfaces. Also used as a general solvent for cleaning brushes and other painting surfaces.

Mineral oil.

Mineral oil is a by-product in the distillation of petroleum to produce gasoline. It is a transparent, colorless oil composed mainly of alkanes and cyclic paraffin's, Widely used as fuel for oil lamps. Mineral oil with added fragrance is marketed as baby oil. Also used as an ingredient in baby lotions, cold creams, ointments and other pharmaceuticals and low-grade cosmetics.

In porcelain painting used as an non toxic open painting medium, but the exhausting fumes during firing are toxic for the lungs so good ventilation is needed.

Mineral oil is sometimes taken orally as a laxative. It lubricates feces and intestinal mucous membranes, and limits the amount of water removed from feces, most

information shows that it passes harmlessly through the gastrointestinal system. If used at all, mineral oil should never be given internally to young children, pets, or anyone with a cough, hiatus hernia, or nocturnal reflux, and should be swallowed with care. Due to its low density, it is easily aspirated into the lungs, where it cannot be removed by the body and can cause serious complications such as lipid pneumonia. While popular as a folk remedy, there are many safer alternatives available. In children, if aspirated, the oil can work to prevent normal breathing, resulting in death of brain cells and permanent paralysis and/or retardation.

Mineral Turpentine

See Turpentine , Mineral Spirits, Odorless Brush Cleaner

Is a crude oil distillate hydrogen treated to a light "n-paraffin".

It has absolute nothing in common with turpentine an oleoresin from pine trees. Also "Schjernerig 163" Turpentine thinner medium is a paraffin crude oil distillate.

MO.

Mineral oil. See mineral turpentine.

Monochrome painting. (Camaïeu)

Painting in one colour where accents are made by the intensity of the colour.

Mop brush.

Synonym; Bunny brush, Makeup brush.

A large soft brush used to gently softening the applied paint in the American soft look technique. Moving the brush nearly touching the paint from light to dark. For a wash-over moving in all directions. Working with the mop brush needs some practice not to really move the paint but just very light touching the surface to take away the brush strokes from painting. Keep your brush dust free otherwise you apply dust to the painting.

MOP.

See: Mother of Pearl.

Mother of Pearl.

Mother of pearl, also known as Nacre or Sadaf, is a naturally occurring organic-inorganic composite of calcium carbonate. There are two common forms of calcium carbonate, aragonite and calcite. They differ in their crystal shape, their chemical formula (CaCO_3) is the same. Many mollusk shells are composed of the aragonite form of calcium carbonate. Abalone shells have a "mother-of-pearl" luster, as do many oysters. This nacre form of calcium carbonate platelets is a special type of aragonite. Nacre is secreted by the ectodermic cells of the mantle tissue of certain species of mollusk. In these mollusks, nacre is continually deposited onto the inner surface of the animal's shell as a means to smooth the shell itself and as a defense against parasitic organisms. This iridescent inner layer is highly attractive and is often used in making jewellery or as inlays. When a mollusk is invaded by a parasite or is irritated by a foreign object that the animal cannot eject, a process known as encystations entombs the offending entity in successive, concentric layers of nacre. This process forms what we call pearls and continues for as long as the mollusk lives. In porcelain painting Mother of Pearl is referred to special lusters giving a shell like surface. To make Mother-of-Pearl more colorful add a drop or two of liquid bright gold in a bottle of Mother of pearl, too much will make it gray.

MX54 medium.

Produced by Ceradel France. (<http://www.ceradel.com>)

For USA and Canada distributed by Sol Brien. (sol.brien@gmail.com)

Basically MX54 is a pine oil mixed with dipentene.

Dipentene is racemic limonene obtained from the rind of citrus fruits. (racemic is equal amounts of left- and righthanded molecules). Dipentene has a lemon-orange fragrance.

As any other pine oil (fat oil) it can be combined with clove oil to keep it longer open.

N

Nacre.

See: Mother of Pearl.

Natural Dicköl.

See: Pine Balsam.

Natural Fat oil.

See: Pine Balsam.

Natural Thick oil.

See: Pine Balsam.

Needle Pick.

This tool looks like a pencil shaped wood with a thick needle stuck in the end of it. It is used to push or pick little spots off the glaze of a painted piece of china. You will push at the spot from all sides until it starts to pop off.

This is especially helpful for portraits. But it takes a lot of hard pushing to get the spots off.

See also: Diamond dentist drill & Diamond polishing file.

Nib.

Pen point used with ink to draw or write or make dots, etc. Look for hard points.

Nikrothal.

Approx. 45% iron- 35% nickel- 20% chromium alloys used for heating wires up to 1100- 1200EC. (2010-2190EF). After long term use at high temperatures crystal growth occurs making the material brittle. See also;

www.kanthal.com/

Non Ping Off: see Reliefs on Ceramics

O

Odourless mineral spirit.

See: Turpentine.

Oleoresin.

A naturally occurring mixture of an oil and a resin extracted from various plants, such as pine or balsam fir, Canada balsam, gum turpentine, copaiba balsam.

P

Painting oil.

See: Mediums for porcelain painting.

Painting medium.

See: Mediums for porcelain painting.

Palette.

Any glassy or non absorbent surface to place the dabs of china paint. In china painting, this surface should be kept as clean as possible, so only put out as much paint as you will use that day.

Pau-de-oleo.

See: Balsam of Copaiba.

Pigments.

Synonyms; Stains.

Originally the pigments for porcelain painting were minerals containing high amounts of metal oxides like Cobalt-, Copper-, Manganese-, Cadmium-, Iron-oxide. Giving only the colours blue, green, brown, yellow and (brown)red. At this moment the introduction of intermetallic compounds and "rare earth elements" like Cerium, Yttrium, Lanthanum and Scandium make a very great range of colours possible. But in some cases a very strict combination with a special glaze is needed. When using the wrong glaze it does not work at all or gives a complete other colour. See under Yttrium.

To give an idea of the combination of elements used for modern pigments see the list below.

apricot Zr-Cr

black Cr-Fe-Co

blue Al-Zn-Co

cobalt blue / blue Si-Co

coral red Zr-Sr-Fe

deep cyan Si-Zn-Co-Cr

green Cr-Ca

grey Sn-Sb

orange Cr-Fe

orange Zr-Fe-V

orange Cr-Ti-Sb

Praseodymium-yellow Zr-Pr-Si

purple Cr-Sn

red brown Cr-Zn-Co-Zr
red / pink / chinese red Sn-Cr-Ca-Si
red brown / brown Cr-Fe-Zn
selenium red Zr-Si-Cd-Se
turquoise yellow Zr-V
turquoise blue Zr-Si-V
victoria green Zr-V-Si

Pigments for air brush.

Violet, dark brown, black and blue porcelain paints are often course grained and give problems using an air brush. To overcome those problems those pigments are now refined in a rotary tumbler using turpentine oil as a liquid and quartz rocks to decrease the grain size of the pigments. The pigment is stored in bottles and just before use poured on a bisque porcelain cup to absorb most of the turpentine. The paint is then used with the normal painting medium (Copaiba plus clove or lavender oil) Those paints are also fantastic for normal porcelain painting. This industrial method can also be downscaled to the hobby painter using small lapidary rotary tumblers!

Pine grease.

See: Pine Balsam.

Pine balsam.

Synonyms: Natural Dicköl, Natural Thick oil, Natural Fat oil, Pine grease.
Tapp a Scottish Pine tree (Pinus Sylvestrus) or any other Pine tree in your garden by drilling a small hole upwards in the trunk and collecting the oleoresin. It thickens quickly exposed to the air but you can thin it with Rosemary, Lavender or Clove oil. It can be used like Balsam of Copaiba and the common Dicköl made from turpentine. The smell is nihil.

Pinene.

See: Turpentine.

Polishing.

Burnishing or polishing of precious the metals Gold, Silver, Platinum. This can be done with standard lapidary polishing powders like: Cerium oxide, Magnesium oxide, Aluminum oxide. Household alternatives are: very fine sand of silica , baking soda and tooth paste. Furthermore with a polished agate stone or a glass fiber brush or glass fiber cloth. The absolute finest polishing can be obtained by using dry Cerium oxide <0.1micron polishing powder on a soft woolen cloth.

Polychrome. (Caitao)

Multi colored painting.

Porcelain.

-Hard-paste porcelain is a hard, dense ceramic that was originally made from a compound of the feldspath rock(25%), petuntse(25%) and kaolin(50%) fired at a temperature of 1400°C.

It was first made in China around the 9th century, distinguished by the type of clay used, kaolin, resulting in a pure white colour. Kaolin ($Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$), or China Clay, which occurs in various parts of the world, is often 95% free of impurities. It is also fired to a vitreous state, transforming the constituent silica to glass.

The secret of its manufacture was not known in Europe until 1709, when Böttger of

Meissen, Germany discovered the formula. Hard-paste porcelain can be utilized to make a translucent bright white ceramic. Unlike other bisque ceramics, porcelain bisque is almost impermeable by water, making it unnecessary to glaze the body before painting. Manufactures such as Lladro, Hummel, and Precious Moments use hard-paste porcelain exactly for this reason.

-Soft-paste porcelain dates from the early attempts by European potters to replicate Chinese porcelain by using mixtures of china clay and ground-up glass or frit; soapstone and lime were known to have also been included in some compositions. As these early formulations suffered from slumping in the kiln at raised temperature, they were uneconomic to produce. Formulations were later developed based on china clay / kaolin(40%), quartz(30%), feldspars(30%), nepheline syenite and other feldspath rocks. Fired at a temperature of 1300°C. These were technically better and continue in production.

-Vitreous porcelain based on modern production techniques and better understanding of the chemical composition and resulting micro-structure of the bisque. Villeroy & Boch has a range of superior vitreous-porcelain in production which are excellent for porcelain painting.

-Bone China.

Bone China is a porcelain containing approx 50% bone ash. The initial development of bone china is attributed to Josiah Spode (1754-1827) Who introduced it in 1797 in his pottery. This was to prove the English solution to the quest for porcelain. Technically bone china is a form of hard paste porcelain The composition is 25% china clay, 25% Cornish stone, 50% bone ash. The firing temperature is 1250°C (lower than the 1400°C for hard paste porcelain). The potters could use their existing methods and ovens. Bone china is extremely hard, intensely white and will allow light to pass through it. The brilliance of enamel colours and gold was greater than on other porcelains. Bone china is more difficult to use in a plastic state, but quicker to cast with than earthenwares.

-Porcelaine Noire.

This is a speciality of Rosenthal in Selb Germany. The bisque core is completely black. It is glazed mat or glossy. Used exclusively for ornamental and creative art objects. Real precious collector items.

Porcelain production.

Schematic modern vitreous porcelain production lines.

Q

Quaking of brushes.

The main reasons for quaking of brushes are;

- * using too much pressure on the brush during painting
- * painting with a very thick and fast drying medium
- * the brush was not perfectly cleaned and dressed

Quartz inversion.

See Silica inversions

Quill brush.

A quill brush was originally a brush wrapped in a natural quill from a feather. The sizes of quill brushes were named after the birds that supposedly provided the

feathers. From small to large, the sizes were: Lark, crow, small duck, duck, large duck, swan, small goose, goose, large goose, condor." The brushes with four or more wire wraps holding the hair were the better quality. Now most brush suppliers use plastic ferrules not real quills and they are still called a quill brush.

To fix them onto the brush handle you can use heat shrink tubing. It comes in various diameters and when you heat it with a heat gun the tubing shrinks and conforms to the taper of both the brush and the quill tip. If you happen to have a quill tip that has split when trying to attach it, then this also is a perfect fix. Put the hairs in very hot water for 5 seconds and roll them in soap to form a foam, roll the hairs between the fingers to reform them again, repeat this until the hairs come back to its original form. You can do this with any brush.

R

Red pigments.

It is common knowledge that red pigments can give all kind of problems. The reason is that we do not know the composition of the pigment and the glaze we are painting on. Furthermore the firing temperature and holding time and the kiln atmosphere are important factors.

Iron oxide based pigments; can give yellow, orange, red, brown, celadon-green colours.

Alkali-Bor glazes gives wine-red. Titanium oxide based matt glazes gives yellow or brown. Tin oxide based glazes red-brown. Zinc-barium matt reduction glazes gives celadon-green. At high temperatures the red colours are fading. Vapors of lusters might also give colour changes.

Lead free Cadmium-Selenium red for transparent glazes reacts with lead or zinc or titanium containing glazes and the colour turns to brown, grey or disappears completely. Also contact area with other pigments give colour changes.

Chromium red pigments; are fading on aluminium- or titanium-oxide rich glazes.

General rules for painting red colours;

- do not mix them with other colours
- use an absolute clean brush or keep a special brush for red
- avoid contact with unfired other colours
- test matt glazes, matting products, yellow paints if they will "eat" the red.

Red Resist

A red gel that peels off

Red resist that has been jellied can be put in the microwave uncovered for a few seconds (10), you can also add a bit of water and put in a sunny and warm place for the gel to liquefy.

Re-Firing old ceramics.

Normally all ceramic items have always a small area that is not glazed. Old ceramics will have absorbed some water or other fluids. The amount depends on the grade of sintering.

Stone- and earthenware articles are very porous. Porcelain is much more sintered. But cheap low grade porcelain will also absorb fluids over a long period of time.

When firing old ceramic items you need to know the sintering grade, because the smallest amounts of water or any other fluid absorbed will evaporate with an

enormous increase in volume and break the item.

As you probably not know the sintering grade of the ceramic, be safe and use always a drying period of an hour for stone- and earthenware and 15 minutes for porcelain at 120 C (248 F).

Only top quality porcelain and bone china are so highly sintered that no fluids will be absorbed and do not need a drying period for re-firing.

Furthermore old items might have hairline cracks you do not see. When firing to fast, hairline cracks might propagate and give a fracture. So heat and cool slow, preferably less than 200 C (392 F) per hour.

Reliefs on ceramics.

There are various kinds of relief powders to paint or print raised parts on glazed ceramics. They consist of a transparent and an opaque white one both for on-glaze or in-glaze technic.

Heraeus H5008 is transparent and H5009 opaque white. Temperature range 750°C (1381°F)

up to 880°C (1616°F). For inglaze technic H5007 transparent and H5006 opaque white. Temperature range 950°C (1742°F) up to 1220°C (2228°F).

Non-ping off: Non ping off was devised to use especially for use on porcelain, which has a hard glaze, like its name says, it will not ping off, as ordinary relief enamel will tend to do when applied to porcelain. It is usually used in the classical way i.e. to produce raised fine scroll work and dots or trellis work to enhance a classic piece of work, similar to work that was historically done on bone china. It can be mixed with water based medium to create a stiff paste which should not be too wet and will stand to form a raised effect on the ware.

How to make a relieved lady beetle on porcelain.

Mix equal parts of transparent and white relief powder and approx 10-15% of metallic red pigment. Add a tiny bit of copaiba or Dicköl to make a thick clay like substance. Roll small balls with your fingers with a size of approx 5 mm (1/5inch) and press it light on a glazed porcelain surface and fire it at cone 16 (792 C, 1458 F). Cool slowly. The result is a bright red ball of approx 4mm (1/6inch) attached on top of the surface. Paint seven black spots, the black head and white eyes on it and fire again. Your Lady beetle is ready. [Lady Beetle. (Lady Bird) Coccinella septempunctata (Coleoptera: Coccinellidae).
Sevenspotted Lady Beetle]

Relief powders

Schjernerig.

Lead containing.

nr. 1 Relief white (= Aufsatzweiss.)

(Special for white motifs on blue or black China.)

nr. 5 Relief yellow (= Aufsatzgelb.)

(Special for light green motifs on blue or black China.)

nr. 110 Opaque white (= Deckweiss.)

nr. 115 Base for gold (yellow).

nr. 140 Relief transparent.

nr. 141 Relief glossy white.

nr. 401 Relief matt white.

nr. 402 Relief matt yellow.

nr. 403 i-Relief.

Lead free.

nr. 2110 Opaque white (= Deckweiss.) (New for nr. 110)

nr. 2141 Relief white (= Aufsatzweiss.) (New for nr. 1 & 141.)

Heraeus.

nr. H5008 Relief transparent. For on-glaze (650-880 °C) (Lead containing)

nr. H5009 Relief white. For on-glaze (650-880 °C) (Lead containing)

nr. H8006 Relief white. For in-glaze (950-1220 °C) (Lead containing)

nr. H8007 Relief transparent. For in-glaze (950-1220 °C) (Lead-free)

Degussa. (Now; Evonik Industrie)

nr. 7002 Relief white.

nr. 10122 Relief transparent

nr. 19083 Relief white.

nr. 13406 Base for gold.

nr. 50135 i-Relief.

Alexanders. (www.porcelainpainters.com Australia)

nr. 100 Texture coat

nr. 112 i-Relief

nr. Cx 02 Carey's raised base for gold

nr. Cx 12 Carey's white Enamel

nr. AP 02 White raised Enamel (760-800 °C)

nr. AP 07 Clear raised Enamel

TCC Porcelain.

nr. 890 White Relief

nr. 893 i-Relief

Repair mixture.

A repair mixture to 'glue' back on piece of broken porcelain can be made by mixing dry Base For Gold powder with Elmer's white glue. Mix until clay like and then stick the pieces together. Be sure and let it dry before firing. This will also repair cracks that are forming and will prevent the crack from going further in most cases. Fill the crack on both sides of porcelain and make sure it's mostly on the edge that is going toward the center to the porcelain. See; Elmers White Glue.

Repel painting.

Select a colour you like, mix the colour with pure jojoba oil. (You can also use more colours.)

Use a flat brush and paint very roughly a glazed tile completely but with light and dark parts.

Use a very fine and pointed brush and a bottle of lemon oil. Apply very tiny drops of lemon oil on the painted tile and wait until the lemon oil repels the jojoba paint in snow flake like patterns. Tilting the tile creates longer shapes. It needs some time to dry before you can fire the tile.

Resist for bisque porcelain.

To obtain an unglazed part on porcelain, cover that part with a solution of bee wax in turpentine oil and some drops of aniline to colour it. The glaze does not stick on the wax and the wax burns completely away during firing.

Reverse painting.

Reverse painting, or back painting, is done on the reverse side of a piece of glass. Outlines are painted first and highlights and shadows following.

Rose du Barry.

In the first half of the 19th century the Chelsea Claret grounding was again introduced by Coalport and Minton under the name "Rose du Barry"
See; Pink to ruby porcelain colors.

Rose Pompadour. Sevres famous pink grounding color introduced in 1791 has the same appearance as Chelsea Claret. See; Pink to rubi porcelain colors.

Rosenthal porcelain.

Philip Rosenthal Platz, D-95100, Selb, Germany.
See; www.rosenthal.de

Rosemary oil.

The shrub *Rosmarinus Officinalis* var. *Angustifolius* is used for the production of Rosemary oil. The best quality is obtained from the flower-tops with the main components; pinene, camphene, limonene, cineol and borneol. A lower quality is obtained from the whole plants also containing: camphor, linalool, terpineols, octanon and bornylacetate. In general the oil is non-toxic and non-irritating to the skin. Widely used in soaps and cosmetics but also in the meat products and alcoholic liqueurs.

For porcelain painting it is used for thinning Copaiba and Fat-oil. No allergic reactions known.

Royal Delft.

The Koninklijke Porceleyne Fles is the only remaining factory of the 32 earthenware factories that were established in Delft in the 17th century. 'De Porceleyne Fles' (The Porcelain Jar) was founded in 1653 by David Anthonisz v.d. Pieth, at the Oosteinde in Delft. After two years, the factory passed into the hands of Wouter van Eenhoorn and Quirinus van Kleijnoven. Wouter van Eenhoorn was a businessman who also had financial interests in other potteries. Little is known about the financial or artistic results of the various companies, and conclusions can only be based on deeds of purchase, sale and contracts. Consequently, we can only suspect that during the period in which the factory was owned by Van Kleijnoven and Van Eenhoorn, it was one of the most important companies of that time and very prosperous. At the end of the 19th century there was only a small part of the once so prosperous industry left. In 1876 Joost Thooft, a Delft engineer, bought the factory with the intention of restoring the old tradition of producing hand painted Delft Blue. Knowing that people had no more confidence in the older, fragile earthenware, he realized that he would have to change the technique completely. He succeeded in finding a mixture of clay that resembled the stronger, white English earthenware. From then on, they made a product that would become world famous. In 1904, 'De Porceleyne Fles' was made into a limited liability company. As a token of appreciation for the attempts the company had been making since 1876 to restore the fame of Delft and the ceramics industry in general, the Porceleyne Fles received the designation 'Royal' in 1919. See; www.royaldelft.com

Royal Goedewaagen.***(four centuries of tradition in ceramics)***

In 1610 family De Jong started in Gouda the ceramic factory "De Star" making simple glazed earthenware in yellow or green. In 1779 Dirck Goedewaagen becomes an important ceramic pipe-maker in Gouda. Dirck's grandson, Pieter, also a pipemaker, married the daughter of the De Jong family. In 1853 Pieter Goedewaagen buys the 'De Star' factory from his father in law. This was the basis of

the Goedewaagen largest pipe factory in the Netherlands. In 1923 by acquiring 'De Distel', an Amsterdam ceramic factory, Goedewaagen acquires outstanding specialists in producing Jugendstil and Art Deco items. Famous designs from Bert Nienhuis, Carel Adolph, Lion Cachet and Willem Hendrik van Norden (a.o.) become classical from this period. The newly granted "Royal" charter combined with developments into dinnerware items in the 1930's make Goedewaagen a forerunner in Dutch ceramics. By buying the assets from the factory "Plaatelbakkerij Zuid Holland" in 1964, Goedewaagen enters new fields, including the production of the miniature ceramic delft houses.

After moving in 1984 the production facility from the crowded city of Gouda to Nieuw Buinen in the quiet north-east of the Netherlands, the company starts expanding into large export markets, notably the USA, which becomes important for museum-reproduction types of Delft ceramics.

Royal Goedewaagen presents its company museum in 1989, in which the rich history of Dutch ceramics, and Royal Goedewaagen's role in that is displayed in ever changing exhibitions. Also in 1989 the take-over of the Gouda-based factory 'Flora' gives Royal Goedewaagen new access to fields in design ceramics developed by famous Dutch artists.

Start of a the millennium, Royal Goedewaagen is essentially an art work shop, where many products are made by hand with outstanding quality production at affordable prices.

See; www.goedewaagen.nl

Rustiban. Rustiban,

manufactured by the Fleischmann Chemical Company consists of 9.8% hydrofluoric acid.) These DANGEROUS products must be used with extreme caution. (See entry under Hydrofluoric acid) Rustiban has been withdrawn from sale in Australia. See also: Whink.

S

Sadaf.

See: Mother of Pearl.

Sand of silica (SiO₂)

Very fine sand used to burnish gold. Silica is a quartz alpha type.

Rub some of this sand with a soft humid cloth on the gold to be burnished. Wash thoroughly to remove all the sand.

Saral or Red Saral.

This is a transfer paper like graphite paper. Note that this graphite leaves a mark on the porcelain after it is fired, not recommended for portraits.

Schjernerig.

Osteralle 21, DK-8400, Ebeltoft, Denmark.

See; www.schjernerig-farver.com

Silica inversions.

During heating and cooling of silica or silica containing ceramics phase changes occurs, called inversions. Two are important as they show a volume change. When passing those inversion temperatures too fast result in such high stresses that the

object breaks.

Crystobalite inversion at 227°C gives a volume change of approx 2.5%.

Quartz inversion at 573°C gives a volume change of approx 1%.

As crystobalite forms during cooling from high temperatures (>800°C) the crystobalite inversion is important by second fires. So for porcelain painting both inversions are always occurring during firing. So heat and cool not to fast and do not open the kiln to early.

Silimanite.

A very heat resistant mineral of aluminum and silicon oxides (63.1% Al₂O₃ and 36.9% SiO₂)

Silk Screen Oil.

Used in making raised paste more pliable.

Sizing of brushes.

The hairs of new brushes are lightly styled in size. Before first use, rinse out with soft soap.

Spike oil.

See: Lavender oils.

Stains.

See: Pigments.

Steam forming.

See heating and cooling.

Stippler brush.

The stippler is a stiff round brush cut on an angle. It is used to merge two colors together by tapping gently back and forth from one color to the other. It is sometimes called a deer foot stippler because it does remind one of the shape of a deer's hoof.

Study.

A pattern. Usually contains a picture of the finished piece, the directions and a line drawing.

Stoneware.

Stoneware is a category of clay and a type of pottery distinguished primarily by its firing and maturation temperature (from about 1200°C to 1315°C). In essence, it is man-made stone. Fired stoneware absorbs up to 5% water when moist not freeze resistant. Glaze may be applied to stoneware pottery before a second firing at a different temperature, or a glaze may be applied before a single, raw firing. Salt-glazed stoneware became the dominant house wares of nineteenth century America.

Sugar medium for pen-work.

Add one part of cornstarch to four parts of icing sugar. Keep this dry.

Add one part of the sugar-cornstarch mixture to three parts of paint powder.

Add water until it flows easily from the pen.

It dries quickly and can then be painted over with Copaiba or fat oil.

Support.

A support, in art, means the 'thing' that we are painting on. For oil painters it can be

a canvas. For watercolors it can be paper. For china painters it means tiles, dishes, etc.

T

Talc. (Soapstone)

$Mg_3Si_4O_{10}(OH)_2$, Magnesium Silicate Hydroxide

An ornamental, heat, acid and electrically-resistant stone used as counter tops, electrical switchboards. The stone looks like milky quartz has a soapy feel and can be scratched by a fingernail making it widely used for carvings. Powder used as an ingredient in paints, rubber, roofing materials, ceramics and insecticides and most commonly known as the primary ingredient in talcum powder. Talc is also used as food additive and in pharmaceutical products. In the European Community the additive number is E553b. Safety of pure talc. Several studies have established preliminary links between talc and pulmonary issues, lung cancer, skin cancer and ovarian cancer. This is a major concern considering talc's widespread commercial and household use. However, no conclusive study has yet been made to determine either the toxicity and/or carcinogenic nature of talc and the long history of safe use suggests that these concerns are unfounded. The U.S. Food and Drug Administration (FDA) considers non-asbestiform talc, that is talc which does not contain potentially carcinogenic asbestiform amphibole fibers, to be Generally Recognized As Safe (GRAS) for use in cosmetics

Temperature conversion.

$t^{\circ}C * 9/5 + 32 = t^{\circ}F$

$(t^{\circ}F-32) * 5/9 = t^{\circ}C$

See; <http://www.onlineconversion.com/temperature.htm>

Terpene.

See: Turpentine.

Terpentine.

Synonyms: Mineral Turpentine, Terps, White spirit, Odourless mineral spirit.

Terpentine is synthetic solvent consisting of nafta plus approx 4% 1,2,3-trimethylbenzene and approx 1% xylene and 0,1% benzene. All those hydrocarbon's are highly toxic, also the vapors. It is very light flammable. Turpentine is not used for porcelain painting but is sometimes mistaken for turpentine. Do not use it for cleaning brushes or porcelain.

Terps.

See: Turpentine.

Therebinth(ine).

See: Turpentine.

Thermal stresses.

See: Heating and cooling.

Thermocouples.

Thermocouples are very accurate temperature sensors.

In 1822, an Estonian physician named Thomas Seebeck discovered that the junction between two metals generates a voltage which is a function of temperature.

Thermocouples rely on this Seebeck effect.

Thermocouples are available either as bare wire 'bead' thermocouples which offer low cost and fast response times, or built into probes.

A number of standard types are used because they possess predictable output voltages and large temperature gradients.

The two most widely used thermocouple types for ceramic kilns are;

Type K (Chromel / Alumel)

(90%Ni, 10%Cr) / (95%Ni, 2%Mn, 2%Al, 1%Si)

General purpose thermocouple up to +1200°C.

Low cost, available in a wide variety of probes.

Sensitivity is approx 41uV/°C.

Type S (Platinum / Rhodium)

(Pt) / (Pt+10%Rh)

For high temperature measurements up to 1760°C.

High cost, high stability, available in a wide variety of probes.

Sensitivity (10uV/°C)

Thick oil.

See: Dicköl.

Thinner.

An organic solvent consisting of a variable mixture of xylene, methylisobutylketone, isopropylalcohol, isobutylalcohol, acetone and butanone. It is highly toxic and light flammable. Do not use it for cleaning brushes or porcelain.

Tin oxide (SnO₂)

Tin oxide is used to obtain opaque glazes for majolica. In combination with titanium oxide (TiO₂) matt glazes can be obtained. Combined with antimony trioxide (Sb₂O₃) gives a strong blue colour. A pink colour in combination with chromium oxide (Cr₂O₅).

Titanium oxide (TiO₂).

Titanium oxide is used to obtain matt glazes. It is also used for crystal glazes in combination with zinc oxide (ZnO). It improves the acid resistance of glazes. Green and yellow pigments can be made with combinations of cobalt, nickel and iron.

TN.

See: Turpenoid Natural.

Toluene.

Synonyms: Toluol, Methylbenzene, Phenyl methane.

Toluene (C₆H₅CH₃) is a very toxic aromatic hydrocarbon used as a general solvent. Used in precious metal porcelain paints. Only to be used in very good ventilated rooms. Concentrations higher than 50 ppm (190 mg/m³) can cause extreme health risks. See: Material Safety Data Sheet T-3913.

Toxic components in Glazes and porcelain paints. That Lead and Cadmium are very toxic is generally known. But also Arsenic, Barium, Antimony and Uranium are very toxic. Lead, Cadmium and Uranium are banned in most western countries. But nevertheless care should be taken with all powders of glazes and porcelain paints.

Toxicity of solvents in precious metal porcelain paints.

Toluene and xylene are widely used in liquid bright gold and liquid burnishing gold but very toxic. See: Toluene and Xylene.

Transfer printing on porcelain and earthenware.

With transfer printing a potter can duplicate patterns by transferring it from an engraved plate to ceramics by use of specially treated paper. John Brooks invented the process in 1751.

The engraver Robert Hancock (1730-1817) working for George Anderton in Birmingham brought the process in 1756 to Worcester. It was also perfected by Sadler and Green in 1756.

In first instance it was used for single color transfer prints with the addition of enameling in bright colors in parts of the design. This process is called Polychrome Enameling.

The process was industrialized and brought to a high standard by Josiah Spood during 1770-1784 as a process for the decoration of ceramic items with blue under-glaze designs having a blurred appearance rather than a sharp pattern. The blue colors flow onto the white body of the ceramic at the time the glaze decoration is fired. The resultant wares are known as Flow Blue Wares. They are found in Semi-Porcelain, Earthenware and Porcelain.

It was also extensively used as "black printing" by Royal Worcester Porcelain Co. See;

<http://www.powerhousemuseum.com/collection/database/?irn=319469>

Nowadays transfers are directly color printed on specially prepared decal paper with porcelain paint ink. Also blank decal paper is available for hand painting a design for later transfer to porcelain.

Turpenoid Natural.

Turpenoid Natural is a product that is made from citrus oils and is used by some teachers as both their medium and their brush cleaner.

Toxic components in Glazes and porcelain paints.

That Lead and Cadmium are very toxic is generally known. But also Arsenic, Barium, Antimony and Uranium are very toxic. Lead, Cadmium and Uranium are banned in most western countries. But nevertheless care should be taken with all powders of glazes and porcelain paints.

Turp(s).

See: Turpentine.

Turpentine oil.

See: Turpentine.

Turpentine.

Synonyms: Turpentine oil, Turp(s), Therebinth(ine).

Obtained by steam distillation of waste wood from Pine trees (Pinaceae) it contains high amounts of terpene (C₅H₈) en pinene(C₁₀H₁₆).

There are many varieties of turpentine. In America mainly from Pinus Palustris and Pinus Caribaea. In Germany, Scandinavia, UK and Benelux mainly Pinus Pinaster and Pinus Sylvestris. In France Strassburg turpentine (Térébinthine au Citron) with a lemon like smell. In Italy Venetian turpentine and in Hungary the Hungarian

Terebinth. In principle they are more or less the same in their use for porcelain painting but painters do have their preference for certain types. Turpentine oil is non toxic, but a lot of people are allergic to it.

U

Underglaze painting.

Painting on raw bisque ceramic and covered with a transparent glaze.

V

Value Finder.

A value finder is a red transparent piece of film which is laid over a painting and reduces the colours into values, light, medium and dark. It doesn't matter what colour is used in the painting, but the value finder gives you an idea of whether it has a light, medium or dark value. By using this value finder, it indicates to you where you need more depth or light areas in your paintings or if it is showing as all being of one value, or no depth to the painting. This way you can give "punch" to your painting where needed.

Vellum.

A powder (usually a white or cream colour) that is painted or dusted onto porcelain then fired to give a matt surface similar to a bisque finish. It can then be painted with matt colours.

Vermiculite.

Vermiculite is a phyllosilicate mineral, resembling mica in appearance.

Chemical Formula: $(\text{Mg,Ca,K,Fe}^{11})_3(\text{Si,AL,Fe}^{11})_4\text{O}_{10}(\text{OH})_2\text{O}\cdot 4\text{H}_2\text{O}$

Vermiculite is basically a hydrated phlogopite mica which has the remarkable ability to expand to many times its original volume when heated, known as exfoliation.

Making it a perfect material for heat insulation. It is found in various parts of the world. The largest mine is located in North-Eastern Transvaal in South Africa.

Vermiculite itself does not contain asbestos, it was the Libby, Montana mine which was contaminated because of the presence in the mountain of a secondary mineral called diopside. It seems that the problems at Libby were unique to Libby. At all the mines currently supplying vermiculite crude ore to processing companies in North America, Europe, and the rest of the world, testing has been done. They all comply with current EPA, OSHA, and European regulatory agencies. For more information see;

<http://www.vermiculite.net/>

<http://www.idph.state.il.us/envhealth/factsheets/vermiculite.htm>

Villeroy & Boch porcelain.

See; www.villeroy-boch.com

W

Water; Free and Crystal bound.

In materials for glazing and porcelain painting water exists in free form and in crystal bound form. Free water will evaporate easily at room temperature and rapidly at the boiling point (100°C) forming steam. Crystal bound water needs much higher temperatures to decompose depending on the composition. Therefore slow heating and a holding time at approx 120°C and 360°C is essential to remove all the water. Do not forget when firing older ceramic products, that they certainly have absorbed water and when heating to fast, steam forming will fracture the object.

Water based mediums.

So called water-base mixtures of sugar, dextrose, Arabic gum, glycerine, (poly)glycols and (higher)alcohols suggest to be less toxic then oil based mediums. But glycols are also bad for your health. A great disadvantage is further the unknown compositions. The only healthy mediums are Copaiva Balsam and sugar/starch/water. But the paints added to the mediums are extremely more toxic, so health is a wrong point of view to chose a medium. A very cheap water based medium is; Sugar medium for pen-work. Add one part of cornstarch to four parts of icing sugar. Keep this dry. Add one part of the sugar-cornstarch mixture to three parts of paint powder. Add water until it flows easily from the pen. It dries quickly and can then be painted over with Copaiba or fat oil.

Wedgwood.

Josiah Wedgwood, Barlaston, Stoke-on-Trent, ST12 9ES, England.
See; www.wedgwood.co.uk

Westfield House

(International painting school) Westfield House, North Ave, Wakefield, West Yorkshire, WF1 3RX, England. See; www.westfieldhouse.co.uk

Whink.

A solution containing hydrofluoric acid used to strip paint off fired china. (the Australia/New Zealand equivalent Rustiban, manufactured by the Fleischmann Chemical Company consists of 9.8% hydrofluoric acid.) These DANGEROUS products must be used with extreme caution. (See entry under Hydrofluoric acid) Rustiban has been withdrawn from sale in Australia. These products eat into the glaze in the process of removing the paint and will leave a shadow that can show through a design subsequently painted on the ware unless a wash of glaze is applied and fired prior to repainting. Reds can fire out in subsequent fires.

White wax transfer paper.

Transferring a design on a dark blue or black plate is a problem. The normal graphite transfer paper gives lines you do not see. When you use the waxy white paper you can not paint on those waxy lines. The answer is transfer your design with the white waxy paper and fire the plate. After firing and cooling down to room temperature wash the plate with water and soap to remove the remains of the wax. Surprisingly you will see your design in white lines !! Paint with anything you want

White spirit.

See: Turpentine.

Wingel.

Winsor & Newton Wingel is an oil-modified alkyd resin that can be used to increase gloss and speed drying. To give fat oil and pure turpentines that extra bit of hardness, add a small amount of "Wingel" it makes your mix fast drying and re-coatable. Thin with turpentine

WOT.

Wipe out tool. Wipe out tools are used to wipe out paint back to white china. It can be used to clean up edges or to draw lines in paint, make dots, etc.

X

Xylene.

Synonyms; Xylol, Dimethylbenzene, Methyltoluene.

Xylene is a very toxic hydrocarbon used in solvents like Turpentine and Thinner.

Y

Yttrium.

Yttrium is one of the so called "rare earth elements". In combination with chromium and a glaze containing aluminum oxide, gives it after firing under oxidizing conditions a brilliant transparent red colour.

Z

Zebra or Zebra Nib.

A zebra nib is a pen-point used to do pen and ink work on china. It is a very fine, but very sturdy pen point.

Zinc oxide (ZnO)

Zinc oxide is used to obtain matt glazes. It is also used for crystal glazes in combination with titanium oxide (TiO₂).