Alumina Hydrate- AL $(OH)_3$ (m.p. 3722 ^oF) used primarily in glazes as a source of alumina.

Antimony Oxide- SB_2O_3 (m.p.1166 ^oF) used in glazes as an opacifier or colorant at temperatures Δ 06-1. In the presence of lead or iron, it produces yellow. Slightly soluble and very toxic.

Ball Clay- used in clays for plasticity. In Glazes, it is used as a source of alumina.

Barium Carbonate- $BaCO_3$ (m.p. 2480 ^oF) it has limited use due to its toxicity. In low temperature glazes (Δ06-5) it produces matt or dull finishes. At higher temperatures (> Δ8) it is a powerful flux.

Bentonite –$AL_2O_3 \cdot 5SiO_2 \cdot 7H_2O$ A superfine colloidal clay. Effect of the particle size and mineral make-up provides a unique quality that promotes plasticity in a clay body and enhance glaze suspension typically less than 2 %.

Bone Ash- (m.p. 2462^oF)

Natural: Bone ash is prepare by calcining animal bones (primarily cow bones) Used as a flux in high-fire glazes >Δ8. Gives texture in low-fire glazes.

Synthetic, Tri-Calcium Phosphate $Ca_3 \cdot PO_4$: Similar to bone ash produced from other Calcium Phosphate sources. Can produce lava-like effects at Δ06 when 8-15% is used.

Borax- $Na_2B_4O_7$ (m.p. 1366 ^oF) know as Sodium Tetra borate and is soluble in water which has limited use in unfritted form. Used in glazes as a source of both sodium and boron and is a powerful flux at low temperatures Δ06-5. Can be used in small amounts (< 10 %) in high temperature glazes to increase fluidity of a glaze to help remedy defects such as scratches, cracks, or pitting. Excessive use can cause pinholing and blistering. Powder is preferred over granular.

Chromium Oxide- Cr_2O_3 (m.p. 4418 ^oF) used in small amounts <2% as a colorant to produce greens. Used in combination with Tin oxide can produce pinks. Bright reds are possible in low-fire lead glazes with low alumina.

CMC- A powder cellulose gum which acts as a thickener, binder, and suspension agent in glazes. Mix with hot water to dissolve and age overnight before adding to a glaze. Mixing Instructions: Mix ¼ to ½ cup CMC in 1 gallon of water and let stand overnight. Add water to adjust for consistency desired.

Cobalt Carbonate- $CoCo_3$ (m.p. 1661 ^oF) used as a colorant to produce blues in glazes.

Cobalt Oxide- Co3O4 (m.p. 1661 ^oF) oxide used to produce blues in glazes. A strong colorant <2%. Often produces mottled blues unless ball milled. When using cobalt carbonate as a substitute, the amount should be doubled.

Copper Carbonate- $CuCo_3$ (m.p. 2100 ^oF) used to produce greens, turquoise, and copper reds at 2-5 %. It is volatile above Δ8.

Copper Oxide Black- Cu_2O (m.p. 2100 ^oF) colorant used to produce greens in oxidation and reds in reduction. More commonly used than red copper oxide (CuO). Copper Carbonate can be doubled for substitute.

Cryolite- $Na_3\ ALF_6$ (m.p. 1828 ^oF) used in glazes where sodium or aluminum are required; however, the fluorine content may cause boiling during melt. A soaking period of ½ hour can help eliminate this problem. Used to produce crater glazes.

Custer Feldspar- Potash Feldspar. Can be interchanged with G200 feldspar for similar results.

Dolomite- $MgCa\ (CO_3)_2$ (m.p. 4800 ^oF) used as a source of magnesium in glazes.

EPK Kaolin- a fine particle kaolin used in clay bodies and glazes. Used as a source of alumina in glazes and in clay bodies for high green strength.

Fire Clay- (m.p. > 2730 ^oF) used for its refractory properties in clay bodies. Due to not being well classified, it can vary in its plasticity and color. Rarely used in glazes.

Fluorspar-CaF_2 Insoluble in water. Used in crater glazes due to its boiling effect when melting.

Frit- is commercially prepared by combining water soluble fluxes with silica and then fused and ground to render fluxes insoluble.

Gerstley Borate-$Na_2O{\cdot}2CaO{\cdot}5B_2O_3{\cdot}16H_2O$ (m.p. 1225 ^oF) a hydrated sodium-calcium-borate used as a low-temperature flux. Standard substitute for Colemanite.

Calcined Kaolin- used in clay bodies to help remedy firing cracks and shrinkage. Used a source of alumina in glazes.

Gold Art- A stoneware clay used to produce buff colors.

Grolleg Kaolin- a washed kaolin used primarily in porcelain bodies to enhance brightness.

Gum Arabic- A powdered natural gum used as a binder in glazes. This material is used widely in the food industry. Gum can be diluted in cold water.

Hawthorn Bond- stoneware clay used in clay bodies.

Illmenite- (m.p. 2489 ^{o}F) used in glazes to produce tans. Granular is used to produce iron speckling in glazes and clay bodies. Rutile can be substituted; however, its coloring strength is weaker.

Iron Chromite- $FeO \cdot Cr_2O_3$ (m.p. 3000 ^{o}F) used in glazes (typically <2%) to produce several colors. With Tin, it can produce pink/reds.

Iron Oxide

Red- Fe_2O_3 (m.p. 2818 ^{o}F) Form of iron most commonly used as a colorant in glazes and clay bodies. Produces tan to brown colors. Can act as a flux in amounts greater than 4%.

Black- (m.p. 2818 ^{o}F) produces a variety of colors. Its affect is often the same as red iron. It is preferred for producing celadon glazes.

Yellow- A manufactured form that is consistent from year to year which can be relied on producing consistent results.

Kaolin- $AL_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ (m.p. 3150 ^{o}F) Also known as china clay and is found in both primary and secondary deposits. In glazes, it is a major source of alumina and can produce matt surfaces when large amounts are used.

Kyanite- $Al_2O_3 \cdot SiO_2$ (m.p. 3300 ^{o}F) Typically not used in glazes but rather clay to stabilize shrinkage and improve the body's strength. Used primarily in high fire refractories such as bricks and furniture.

Lithium Carbonate- Li_2CO_3 (m.p. 1330 ^{o}F) It is a strong flux at high temperatures (Δ5-13) in alkaline glazes. It is less soluble and produces a more durable glaze than other alkaline compounds.

Magnesium Carbonate- $MnCO_3$ (m.p. 5072) At high temperatures (Δ 9-16) it has a similar effect a alumina and in glazes Δ 5-10 can produce a buttery surface desired for functional ware.

Manganese Dioxide- MnO_2 (m.p. 3000 ^{o}F) Used to develop red, blues, purples and black. It is a strong flux at Δ5-10. Granular forms can be used to produce speckling in both clay bodies and glazes. Manganese Carbonate is a weaker form and at minimum can be doubled for substitution.

Mullite- $3Al2O_3 \cdot 2SiO_2$ (m.p. 3300 ^{o}F) Calcined Kyanite and the named after the only known deposit on the Isle of Mull in Scotland. Like Kyanite, it is usually not found in glazes. Can be added to clay bodies to improve strength and modify thermal expansion.

Nephaline Syenite- $K2O \cdot 3Na_2O \cdot 4Al_2O_3 \cdot 9SiO_2$ (m.p. 2200^{o}F) Is a Feldspathic material used in both glazes and clay. Chemically similar to feldspars, however they contain 2/3 the amount of silica. Can reduce glaze defects such as crazing in glazes Δ011-5.

Potash Feldspar G200- Used in glazes and clay bodies. It contains 10% potash and 2-3 % soda. Can be interchanged with Custer feldspar for similar results.

Petalite- $Li_2O \cdot Al_2O_3 \cdot 8SiO_2$ (m.p. 2550 ^oF) A source of lithium in clay and is primarily used for flame ware to reduce thermal expansion and increase thermal shock resistance.

RedArt- Has a firing range of Δ06-1 and is used in earthenware clay to produce a strong red color.

Rutile- TiO_2 (m.p. 3452 ^oF) a less expensive form of Titanium Dioxide when purity is not required. Used in clay and glazes (typically 1-3%). In oxidation glazes, it produces a ivory to yellow/tan and in reduction produces purples and blues. It's most common use is to interact with other colorants yielding mottling and streaking.

Dark Milled- grade between Illmenite and Rutile. Has a greater amount of iron.

Light Ceramic- A fine particle true Rutile with some iron contamination.

Granular- a coarse particle with some iron contamination and is used to produce speckling or mottling at higher temperatures (Δ8-13).

Silica- SiO_2 (m.p. 3452 ^oF) Is the most abundant material in the Earth's crust. Frequently referred to as flint. Silica is the most common glass former in glazes.

Soda Ash- Na_2CO_3 (m.p. 900^oF) a very active flux at low temperature below Δ5. It is water soluble and is used in the fritted form in glazes to prevent re-crystallization. Glazes that use raw soda ash should be well mixed and used immediately to prevent re-crystallization . Used in small amounts as a deflocculant in slip casting to reduce the amount of water needed to make the slip fluid.

Soda Feldspar NC4- Can be easily interchange with Kona F4 feldspar for similar results. Contains 10% soda and 2-3% potash.

Spodumene- $Li_2O \cdot Al_2O3 \cdot 4SiO_2$ (m.p. 2100^oF) source of lithium for clay and glazes and can be substituted for soda or potash feldspars in clay bodies to reduce the maturing point. It can improve crazing in glazes if substituted for feldspars; however, the maturing temperature will be reduced.

Strontium Carbonate- $SrCO_3$ (m.p. 1652 ^oF) Similar to whiting in glazes. Is sometimes substituted for Barium Carbonate for similar results. Is a strong flux at higher temperatures and can improve craze or scratch resistance.

Talc- $3MgO \cdot 4SiO_2 \cdot H_2O$ (m.p. 2730^oF) Also known as soapstone and is used in clay bodies to lower the maturing point and improve thermal shock.

Tile #6 Kaolin- a secondary kaolin with a high plasticity and brightness.

Tin Oxide- SnO_2 (m.p. 2066 ^oF) Is a strong opacifier in glazes. Should be calcined at red heat if used in glazes above 8% to prevent crawling. Zircopax Plus can be substituted for similar results.

Vanadium Pentoxide- V_2O_5 (m.p. 1270 ^oF) Used as a colorant to produce yellows to browns. Very toxic.

Vee Gum T- A superfine pure bentonite used in clay and glazes as a plasticizer or suspension agent.

Volcanic Ash- Also known as pumice which is a ground volcanic material. Is rich in silica and potash feldspar.

Whiting- $CaCo_3$ (m.p. 4650^oF) also referred to as calcium carbonate. In high-fire glazes can improve the durability of a glaze.

Wollastonite- $CaSiO_3$ (m.p. 2804^oF) Can be used to replace silica and whiting in glazes to produce a smoother and brighter glaze.

Yellow Ochre- $Fe_2O_3 \cdot H_2O$ (m.p.2415 ^oF) rarely used in glazes as a colorant. Used in engobes to produce yellows to browns. Used in clays to produce buffs.

Zinc Oxide- ZnO (m.p. 3272^oF) In glazes, it is used as a flux, opacifier, and color modifier. It reduces glaze expansion and improves crazing. Calcined form is preferred over raw in crystalline glazes.

Zircopax Plus- $ZrSio_4$ (m.p. >3600^oF) used as an opacifier in glazes. Can be substituted for Tin oxide; however, it is weaker.