

The first and third varieties are easily fusible, the second or potash glass is hard and difficultly fusible. The oxide of lead increases the specific gravity, lustre and fusibility of the glass. The materials must be mixed with a quarter or half their weight of "cullet" or broken glass. After the glass is blown or cast it is exposed to the process of "*annealing*" or slow cooling; otherwise it is brittle.

(b) COLOURED GLASSES.

Ferrous Oxide (Fe O) produces a *deep green*, Manganese Dioxide (Mn O₂) a purple tint to glass.

To obtain a colorless glass in materials not entirely free from iron, Manganese Dioxide is used, the violet being complimentary to the green. Arsenic Trioxide As₂ O₃ ensures the same end by oxidizing the ferrous to Ferric-Oxide.

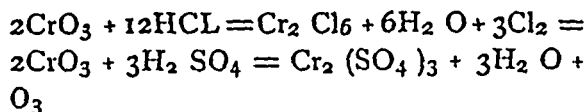
By the addition of certain oxides to the brilliant lead glass called "paste," the colours of precious stones are imitated. Cobalt Oxide Co O yields the blue of the Sapphire; Cuprous Oxide Cu₂ O a ruby-red; Ferric Oxide Fe₂ O₃ the yellow of the topaz.

(c). *Porcelain and Earthenware* consist of Silicate of Aluminium, i. e. clay covered with a substance which fuses at a high temperature and forms a glaze, so binding the materials together.

The material for porcelain is the finest white or China clay = kaolin, whilst for the common earthenware a colored clay may be used.

The glaze for porcelain is generally finely powdered felspar, for earthenware the so called "salt glaze" is used. In the first place the porous ware is dipped in the vessel containing the felspar suspended in water and then strongly fired; in the second, common salt is thrown into the furnaces.

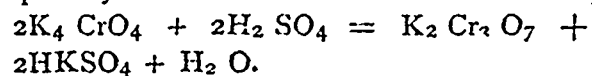
By the volatilization and decomposition of the salt upon the heated surface, the deposit of a fusible Silicate is made, thus rendering the ware imperious by moisture.



CHROMATES.

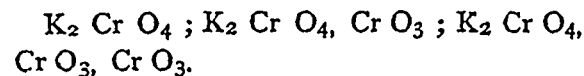
(b) If any Chromic compound be fused with Potassium Carbonate it becomes oxidized, and a soluble yellow Chromate, K₂ CrO₄ isomorphous with Pot. Sulphate (K₂ SO₄), and Pot. Manganate (K₂ MnO₄), is formed. Chromium compounds are prepared by this method from Chrome iron ore.

(c) Red crystals of the BICHROMATE, K₂ Cr₂ O₇, separate out when Sulphuric is added to a solution of the Chromate in sufficient quantity to combine with half the base:



(d). If to the solution of the bichromate a solution of chromium trioxide be added, Potassium Trichromate K₂ Cr₃ O₁₀ crystallizes out.

The bichromate is the chromate plus one molecule of chromium trioxide, the trichromate is the same plus two molecules of the oxide.



(e). The orange-red basic chromate of lead, Pb O, Pb Cr O₄, is obtained by heating lead chromate, Pb Cr O₄, with a solution of caustic potash (KOH).

(f). Chromium Oxychloride or Chromyl Chloride, Cr O₂ { $\begin{smallmatrix} \text{Cl} \\ \text{Cl} \end{smallmatrix}$ } is a dark, red, strongly fuming liquid, boiling at 116.8° (Sp.G. 1.92). It is formed by distilling potassium bichromate, sulphuric acid and common salt.

(g). Upon cooling a solution of potassium bichromate in warm hydrochloric acid, large red crystals of Potassium Chloro Chromate, K Cl Cr O₃, separate out. The substance is intermediate between Chromium Oxychloride and Potassium Chromate.

