

CHARACTERISTICS OF CALAMINE AND NATURAL PIGMENT FOR ANTI-RUST PAINTINGS

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Abstract : Abstract.This work has a double objective. On the one hand, the valorization of natural raw materials, in particular, the oolithic iron ores which do not find their use in iron and steel because of their high phosphorus content and on the other hand the recycling of steel by-products.. The ultimate goal is to synthesize an anti-corrosion paint.In this first part, we will study the characterization of these two components by their chemical analysis, their grinding (fineness) and their thermal analysis (TGA, DSC).Chemical analysis showed that the pigment contains 53.18% of total iron and gangue dominated by silica. Calamine in turn contains 73.83% of iron in the form of iron oxides (FeO, Fe₃O₄ and Fe₂O₃).Iron pigment is composed mainly of hematite with a little of goethite.Grinding tests showed that the scale is much more suitable for grinding than pigment. The granulometric analysis measured by a laser granulometer (Hydro 2000MU) gave us a volume distribution of the particles with a size between 0.7 and 32 microns for scale and between 0.6 and 40 microns for the pigment and Their specific areas are 1.6 and 1.5 m² / g..Thermogravimetric analysis (TGA) and the thermal variation of flow (DSC) showed that the iron pigment loses weight with phase dissolution by consuming energy when the temperature increases. Scale gains weight by the formation of new phase with heat.Exploration picture by scanning electron microscope of red iron pigment shows a grain aggregate formed rounded over at least iron oxide and gangue. The analysis by EDS shows a predominance of iron with a relatively large matrix containing the four predominant oxides in the case of iron ore deposits. Chemical elements forming these four oxides are silicon, calcium, aluminum and magnesium.The observation scale milled for 5 min SEM showed a homogeneous structure composed of sizes of iron oxide grains and shapes ranging from 1 µm to 10 µm.

Keywords : Pigment iron, scale (calamine), iron oxides, grinding, Simultaneous thermal analysis.