

SOLID PHASE SYNTHESIS OF IRON OXIDE FROM WASTE PRODUCTS

Y. S. Kostenko - *Sumy State University,*
1st -year postgraduate

Iron oxide pigments, is one of the most common groups of inorganic pigments. Iron oxides are durable, economical, do not have a significant impact on the environment, safe for health. The need for iron oxide pigments today is quite high.

It was of great interest to study the possibility of solid-phase synthesis of iron oxide pigments from waste products.

Green vitriol was selected as raw material, i.e. the waste product of pigment titanium dioxide produced by PJSC “Sumykhimprom”.

The possibility of obtaining a wide color spectrum of the product (from ocher to cardinal purple) by calcination of green vitriol at 725 °C with simultaneous introduction of modifying additives was studied. As modifiers there were employed: sodium chloride, modifier number 1, modifier number 2. Quantity of the modifier was changed in the range from 1 to 10 % wt. The process was carried out under laboratory conditions by dehydrated green vitriol at 130 °C, calcined iron sulphate monohydrate at 725°C for 4 hours, washed and dried reaction product. After that, iron oxides of wide color, of red shades spectrum were obtained.

The analysis of derivatograms and micrographs showed that the introduction of modifiers had affected the course of chemical reactions in the preparation of red iron oxide on this technology.

The performed IR spectral analysis of the sample allows to guarantee that the resulting iron oxide corresponds to the chemical formula close to Fe_2O_3 .

Thus, it is shown that having applied the method of solid phase synthesis, with the introduction of modifying additives, it was possible to obtain the iron oxide pigment with a wide color range from ocher to cardinal purple.

V. S. Kurochkina – *EL Adviser*

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