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Bright memory to the corresponding member of RAS V.A. Zhabreva is dedicated

Preparation of sodium chromophosphate ceramic pigment in system $Cr(NO_3)_3 \cdot 9H_2O – Na_4P_2O_7 \cdot 10H_2O$

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Abstract

The most economically feasible way to expand the range and improve the properties of organosilicate coatings in the system "polyorganosiloxanes – layered hydrosilicates – pigments" is the use of new inorganic pigments in their composition. In this paper, the synthesis of sodium-chromium phosphate ceramic pigment is considered by mixing equivalent quantities of $Cr(NO_3)_3 \cdot 9H_2O$ and $Na_4P_2O_7 \cdot 10H_2O$ crystalline hydrates with subsequent high-temperature treatment. For the products obtained, the data of X-ray phase analysis, complex thermal analysis, active specific surface, SEM-visualization of the morphology of pigment powders are given, color characteristics are described in the CIELAB color coordinate system. In the system under consideration, after heat treatment at 900 °C, a two-phase product is formed, consisting of $NaCrP_2O_7$ and α-$CrPO_4$. The synthesized pigment composition contains nanoscale structures. The degree of washing the sediment affects the weight loss when heated in air, the appearance of split, disordered crystal structures and the color shades of the pigment. The synthesized pigment differs from chromium oxide and from the mixture of chromium oxide and titanium dioxide in a lighter tone, the coordinate *b** is closer to the blue region of the spectrum, the *a** coordinate is also shifted more to the blue region, compared to chromium oxide and a mixture of chromium oxide and titanium dioxide, for which the coordinate *a** is shifted to a greater extent in the green region of the spectrum. The use of the crystallization water of the components as a reaction medium, in contrast to dilute aqueous solutions, makes the synthesis of sodium-chromium phosphate ceramic pigment more efficient: the yield of the desired product is significantly increased, the process becomes more manageable, the number of phases in the pigment composition decreases, the synthesis occurs using a smaller amount of water, the quantity of washing wastewater is reduced.

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