

INNOVATIVE TECHNOLOGIES OF ENVIRONMENTALLY FRIENDLY URALKYD MATERIALS

Jonas Fogelberg¹, A. G. Kot², R. S. Rohozhyn², G. I. Gurina³, PhD Chem., Associate Professor

¹*Algol Chemicals AB, AC - Coatings & Polymers;*

²*Algol Chemicals Oy,
Karapellontie 6 P.O. Box 13 FI-02611 Espoo, Finland;*

³*O.M. Beketov National University of Urban Economy in Kharkiv
Marshal Bazhanov str., 17, Kharkiv, 61002, Ukraine
e-mail: Galyna.Gurina@kname.edu.ua*

A promising direction in the development of modern chemistry and technology of paint and varnish composite materials is the development of compositions with a low content of volatile compounds, the use of functional additives to improve rheological and adhesive properties, and the study of the behavior of nanocomposite structures and additives on the properties of materials.

The paper considers the results of creating environmentally friendly paints and varnishes based on uralkyd organic oligomers, modern ceramic fillers, organically modified layered aluminosilicates with a solvent content of not more than 300 g/l.

The developed materials are hybrid nanocomposite structures, the crystallographic motif of which is determined by the structure of montmorillonite.

Material properties were studied by infrared spectroscopy, X-ray phase analysis, thermogravimetric analysis, which showed the formation of exfoliating delaminated structures.

One of the tasks was to create a paint and varnish pigmented material that meets the European standards for the content of volatile organic compounds using organobentonites.

The number of ceramic microspheres has been optimized to obtain an environmentally friendly material by replacing the proportion of the pigment part of the enamel from standard pigments and fillers.

The effect of ceramic fillers on the optical, mechanical and decorative properties of coatings has been studied.

The formulations of environmentally friendly enamel are calculated, the choice of types of uralkyd resins with a low content of VOCs is justified. Resins with 60 % content of non-volatile substances were used in the work. Based on the results of the use of organobentonite in the composition of filled paints and varnishes, it was established that the properties of pigmented materials according to new formulations and coatings correspond to the requirements of normative and technical documentation for enamels such as adhesion, resistance of coatings to water and detergents, elasticity, impact resistance, hardness.

The resulting materials were recommended for coatings on metal and wood surfaces when painting metal structures, agricultural machinery, rolling stock of railways, cars.