PREPARATION OF NEW HYBRID COMPOSITES BASED ON CLAY MINERALS MODIFIED WITH OXYQUINOLINE POLYMER RESIN

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One of the most significant environmental problems today is environmental pollution by toxic substances, in particular industrial waste. Heavy metals, which enter the aquatic environment from various anthropogenic sources, are of particular danger, reducing the reserves of high-quality drinking water. In this regard, today the development of effective methods and materials for water purification from heavy metal ions is an extremely urgent task. Due to their unique properties, natural clays are considered as promising materials for the removal of heavy metals from wastewater [1]. Clays have several advantages over other adsorbents: they are available, inexpensive, non-toxic, have a large specific surface area, exhibit excellent adsorption properties and are capable of ion exchange, and are also suitable for recovery and reuse. The processes of heavy metal adsorption by clay minerals include various mechanisms, including direct binding of metal cations to the mineral surface, ion exchange, and formation of surface complexes. At the same time, the efficiency of natural clays as adsorbents of heavy metals can be significantly increased by modifying their surface with polymers, which significantly increases both the number of centers for adsorption of metal ions and expands the list of heavy metal ions that can be bound by such an adsorbent (fig.1).

This paper presents a study on the creation of new polymer-mineral composites based on natural clays, on the surface of which poly[8-hydroxyquinoline formaldehyde resorcinol] was immobilized. These polymers were synthesized by polycondensation of 8-hydroxyquinoline, formaldehyde and resorcinol in acidic and alkaline media . The structure of the synthesized polymers was confirmed by NMR and IR spectroscopy.

Based on three natural clays (bentonite, saponite, clinoptilolite), new polymer-inorganic composites were obtained by physical adsorption of a polymer synthesized in an acidic environment on the surface of natural clays, and a polymer-inorganic composite based on clinoptilolite was obtained by in situ polycondensation of the starting monomers. The structure of the synthesized polymer-inorganic composites and the effectiveness of immobilization of the polymer poly[8-hydroxyquinoline formaldehyde resorcinol] on inorganic carriers were investigated by IR spectroscopy and thermogravimetric analysis.

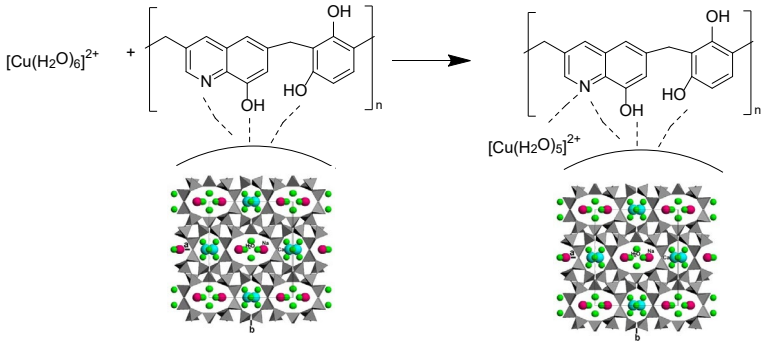

Figure 1. Scheme of adsorption of heavy metal ions on the surface of composites

References:

1. M. E. Jiménez-Castañeda and D. I. Medina. *Water*, ***9,*** 235-247, 2017.