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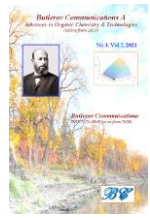

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Physico-chemical grounds of technology for reprocessing outdated pyroxylin powders using aqueous solution of zinc chloride

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Abstract

This work presents a method of an extraction of powder components, containing a trivalent nitrogen, from the composition of pyroxylin powders using the aqueous solutions of complexing extragents. The aqueous solution of zinc chloride was used as an example.

This method is based on the reagents' interaction according to a donor-acceptor mechanism, in which a nitrogen atom with the undivided electron pair of a diphenylamine (DPA) molecule acts as a donor of electrons and a zinc ion Zn^{2+} with free *p*- and *d*-orbitals acts as an acceptor. The result of this interaction is a formation of complex compounds such as "double salts" of $xMCln{\cdot}yDPA{\cdot}zH_2O$ composition, which promotes an increase in a solubility of DPA in an aqueous solution of salt and a strengthening in its extraction from a powder composition.

The aqueous solutions of metal chlorides of a family of iron (iron, cobalt, nickel) and aluminium were previously used as complexing extragents, which showed a possibility of an extraction of organic compounds, containing trivalent nitrogen atom, from powder composition.

The aim of this work is a development of a technology for utilization of old and substandard pyroxylin powders using the aqueous solution of zinc chloride with determining optimum technological conditions for a treatment of powders in order to extract diphenylamine as much as possible from their composition. After a solvent regeneration, labile complex compounds of $xZnCl_2{\cdot}yDPA{\cdot}zH_2O$ composition, generated as a result of the interaction, can be recycled in the technological process.

The proposed method for reprocessing nitrocellulose powders, in particularly, porous pyroxylin powders, can be used for utilization of substandard powders or powders with

an expired shelf life by extracting organic additives from their composition and with a subsequent extraction of cellulose nitrates in pure state for their application in production of products for civil purpose. Moreover, the extracted diphenylamine can be used as a chemical agent or a stabilizer of chemical stability in a powder production as far as it is accumulated.

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