

Hydrochemical processing of kaolin concentrates with complex extraction of useful components

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Abstract

Silicates and aluminosilicates, including kaolin concentrates, are inexhaustible source of alumina, silica, aluminum and silicon. Experiments were carried out on samples of kaolin concentrates produced at enrichment of raw quartz-feldspar-kaolin from the Chalgany deposit (Amur region). Leaching of kaolin concentrates was carried out in aqueous solutions of ammonium bifluoride and fluoride to produce ammonium hexafluorosilicate and hexafluoroaluminate. In the following steps, separated from the reaction mixture ammonium hexafluorosilicate and hexafluoroaluminate were dissolved and hydrolyzed in aqueous solutions under the influence of ammonium hydroxide to form nanometer-sized amorphous silica and aluminum hydroxide. Conditioned metallurgical alumina is extracted from aluminum hydroxide using calcination. The reaction of ammonia fluoride and ammonia water regeneration, those are entered on the stage closed technological processes after reduction was studied. Impurity compounds are separated on the different stages of hydrochemical processing. Thermodynamic parameters, rate constants and activation energy of hydrochemical reaction of processing of kaolin concentrates are determined. Low-waste material flow diagram is composed and the expenditure coefficients for every chemical compounds participating in technological processes are installed. These investigations are resulted in hydrochemical method of processing of kaolin concentrates with complex extraction of various useful components. The developed method could be applicated for complex processing of kyanite and nepheline concentrates and industrial wastes-ash from coal burning of thermal electro-centrals.

Biography

V S Rimkevich has completed his PhD from Moscow State University and received the rank of Professor from Russian Academy of Natural History. He is Head of the Laboratory of Scientific Technologies of Mineral Raw Ores Processing of Institute of Geology and Nature Management FEB RAS. He is an author of more than 60 papers in reputed journals and has 14 patents.