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COMPARISON OF PHOSPHONIC AND PYROPHOSPHONIC ACIDS AS COLLECTORS FOR THE CASSITERITE FLOTATION

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Styryl phosphonic acid (SPA) is a collector used in the industrial flotation of cassiterite. During its production from styrene and PCl_5 by-products are formed in different amounts. One of these is condensed SPA caused by incomplete hydrolysis of the intermediary phosphonic acid chloride. Attempts were made to synthesize definite forms of condensed SPA in order to study their influence on the results of flotation. Conventional methods - partial hydrolysis of phosphonic acid chlorides or reaction of acid chlorides with the free acid - did not lead to the desired result. Diammonium salt of the pyro-SPA was obtained by the method of (1) using dehydration of phosphonic acid by heating with urea. A series of analogous aromatic pyrophosphonic acids was synthesized. The hydrophobization effect on SnO_2 surfaces was studied by microflotation tests in a modified Hallimond tube. Pyrophosphonic acids are more hydrophobic than the corresponding phosphonic acids. The results of the microflotation experiments were confirmed by batch flotation tests with a natural tin ore in a 2-1 cell. The Sn recovery was higher with the pyro compounds.

(1) U. Schülke, *Z. anorg. allg. Chem.* (in press).