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## OPTIMIZATION OF PROCESS FOR TOTAL RECOVERY OF ALUMINUM FROM SMELTING SLAG 1. REMOVAL OF SOLUBLE SALTS

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### Abstract

Washing black aluminum (Al) slag to obtain soluble salts is an important stage of the smelting slag treatment at technological process. This process is used to recover Al as a coagulant for water purification. This research aims at establishing the optimal conditions for washing (e.g. temperature (T), solid: liquid ratio (S : L), time, the recirculation waters in the system). The goal of research was to determine: a) the removal with maximum efficiency of the soluble salts from black Al slag; b) to increase the salt content in the washing waters; c) to decrease the water consumption. Besides, experiments were carried out to establish the washing parameters for quantitative recovery of Al sulfate out of acid leaching residue. X-Ray Powder Diffraction Phase Analysis has been performed for monitoring phase's composition of initial and final slag, after the washing process. Metallic Al and Aluminum Nitride (AlN) partially disappear from washed slag, resulting in formation of Al Hydroxides and Oxihydroxides. Also, the washing process, lead to complete removal of Halite and Sylvite. Experiments were carried out at the micro-pilot level. At the end, the flow sheet of the process for quantitative separation of soluble compounds from black Al slag is given.

*Key words:* aluminum slag, AlN, soluble salts, washing process

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