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MINIMIZATION OF CHEMICAL RISK BY USING RECOVERED ALUMINIUM FROM METALLURGICAL SLAG AS COAGULANT IN WASTEWATER TREATMENT

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Abstract

Secondary aluminium production inherently generates significant amounts of slag of variate composition and including dangerous compounds. Consequently, a care treatment of the resulted slag is imperatively necessary for preventing the environment pollution and for recovering valuable materials even if present in low amounts. The aluminium recovering procedure is based on a chemical and hydrometallurgical slag treatment, leading to the technical grade aluminium sulphate (AS), possible to be used for the chemical treatment of wastewaters, or for processing the resulted primary and secondary sludge from treatment plants. To check such a possibility, lab-scale tests have been performed by using the recovered AS from different sorts of slag coming from small or large metallurgical units of Romania. A municipal wastewater was separately treated with commercial AS and with recovered AS, the optimal dose and pH being established by mean of the standard Jar-test. The short time well mixing of wastewater allow a good dispersion of the added AS and micro-flocculation. The subsequent slow and longer mixing allows formation of large flocks easy to be separated by a gravitational method (sedimentation). The experimental results indicate no major differences in the removal efficiency of chemical oxygen demand (COD), phosphorous, and total suspended solids (TSS) between the used recovered vs. commercial AS. The recovered AS from metallurgical slag is proved as being a valuable coagulant, contributing to agglomeration of suspended solids and colloids, and to the adsorption of various dissolved chemicals or dyes from wastewaters.

Key words: metallurgical slag, aluminium sulphate, chemical treatment, wastewaters

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