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EXPERIMENTAL INVESTIGATION TO RECOVERY OF RARE EARTH ELEMENTS (REES) FROM HUNGARIAN RED MUD USING OPTIMIZATION TECHNIQUE

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The objectives of this work was to develop new ways and methods for the recovery of the rare earth elements (REEs) such as (Sc, La, Y) from the Hungarian red mud, Ajka, MAL company, which is presently considered as a waste material and to achieve optimum REEs recovery combined with low iron dissolution by using (WinQSB) and (Statistica) software's to predict the optimum conditions. Red mud or bauxite residue derives from Bayer process to produce alumina. The residue of the bauxite processing stems from digestion of the bauxite with sodium hydroxide at elevated temperature and pressure. Depending on the origin of the bauxite, the red mud may contain significant amounts of REEs. In Hungary karstic bauxite had been processed. The REEs recovery procedure includes using a combination of technological steps acid leaching, solvent extraction and ion exchange adsorption. The extraction of REEs from red mud by selective acid leaching was investigated in our study. Hydrochloric (HCl), sulphuric (H_2SO_4) and nitric (HNO_3) acids were applied for leaching. The chemical composition of leaching solutions was investigated by ICP-OES techniques. The effect of parameters including different acid concentrations, acid compositions, leaching time were studied.

Keywords: *Rare Earth Element, Red Mud, Acid leaching, Optimization, Scandium recovery*

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