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DETERMINATION OF THE RARE EARTH METALS IN THE RED MUD FOR POSSIBLE UTILIZATION

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Abstract

Huge amount of red mud has been disposed for the past several decades and it is still generating all over the world. Red mud is a waste of the bauxite processing industry obtained during the alkaline extraction of alumina from bauxite ore. The red mud is a potential raw material containing several valuable components including iron, titanium and rare earth metals. The aim of the research was to develop an appropriate acid digestion technique for the red mud in order to determine the amount of rare earth metals (Nd, Sc, Ce, Gd, Sm, La, Y, Pr, Eu, Dy, Ho) in the red mud by ICP analysis. Sand bath acid digestion and microwave acid digestion techniques were applied. Based on the outcome of the ICP analyses conclusions were drawn on the determination of the individual REE elements regarding the optimum conditions (type of acid digestion, acids applied) of the acid digestion. The highest value for the total amount of REEs (923 ppm) in the red mud was obtained after microwave digestion in 3HCl:1HNO₃ acid mixture. The precise determination of the metal composition of the red mud is the first step in the development of utilization process for the red mud.

Key words: microwave acid digestion, red mud, rare earth metal elements, sand bath acid digestion

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