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Extraction of silica from palm ash using citric acid leaching treatment: Preliminary result

Abstract

Large quantities of agricultural wastes such as palm ash and rice husk are found throughout Malaysia, have a possibility to be used as a usefully renewable source for production of energy and silica (SiO2). Extensive researches have been carried out to extract silica from agricultural wastes such as rice husk, due to silica as a useful raw material for industrial application. In the previous studies, the strong acid leaching treatment was carried out to remove metallic impurities and organics contained in rice husk. Since leaching treatment is a proper route to extract the silica, sulphuric acid (H2SO4), hydrochloricacid (HCl) and nitric acid (HNO3) solutions are currently used in leaching treatment to prepare silica materials [1]. A strong acid leaching treatment, however, is significantly hazardous to the environment and people. In this study, the weaker acid, citric acid solutions were used to replace strong acid in leaching processes. Preliminary results showed that silica can be extracted from palm ash using citric acid leaching treatment under the optimum extracting conditions with 70°C of solution temperature, 60 minutes of reaction time and concentration of citric acid of more than 2%. The purity of silica extracted is more than 90%.

Keywords

Agricultural wastes; Organic acid; Palm ash; Rice husk; Silica