

Optimization of silicon extraction from tanjung tiram asahan natural sand through magnesiothermic reduction

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Abstrak

We carried out silicon extraction from the natural resources of Tanjung Tiram Asahan, Batu Bara Regency, North Sumatra through variation of heating temperatures and magnesiothermic reduction. Prior to the extraction, the sand from the natural resource was refined until the solid white silica powder was separated. The reaction conditions were performed at various heating temperatures in a furnace, as follows: at 750 (2 hours), 800 (3 hours), 850 (3 hours), 900 (3 hours), and 950 (3 hours). Optimization of the extraction reaction conditions was then performed using magnesiothermic reduction at several silica and magnesium ratios, i.e. 1:1.125, 1:1.50, 1:1.75, 1:1.20, and 1:1.25. The refined silica, together with all of the silicon products from the extraction, was characterized using XRD and analyzed. The morphology of the reaction product was characterized using an electron microscope. The results showed that changes to the silicon products after extraction varied, depending on temperature. Optimization of silicon extraction from silica was obtained at 800°C for 3 hours, with a silica and magnesium ratio of 1:1.75.