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TiO₂ mineral from Ilmenite: Development of extraction method and its characterization

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Study on mineral characterization and TiO₂ extraction by leaching method using H₂SO₄ on iron sand of Tapunggaya–Southeast Sulawesi has been conducted. Results of initial testing using X-Ray Diffraction (XRD) and X-Ray Fluorescence (XRF) on sample of Tapunggaya iron sand showed that there were 4 major compounds namely Fe₂O₃, TiO₂, MgO, and SiO₂ in the mineral. TiO₂ extraction was conducted using sulphate method, by reacting milled iron sand with sulfuric acid at high temperatures (>110°C) for ±30 minutes. Titanium extract was then heated at a temperature of 90°C to precipitate TiO₂. The precipitate was obtained by centrifugation at 10,000 rpm for 10 minutes to solidify the precipitate and separate from the liquid phase of H₂O and the remaining sulfuric acid. Subsequently, the extract was calcined for ±7 hours at temperature of 500°C and 1000°C to obtain TiO₂ anatase and rutile then purified with HCl and HNO₃. XRD and XRF characterization results showed the obtained TiO₂ extract containing anatase of 8.97% (70.3°; 1.337 Å) and rutile of 19.78% (54.2°; 1.699 Å).

Biography

Muhammad Nurdin has completed his PhD at the University of Indonesia, Jakarta and Tokyo Institute of Technology, Japan (Sandwich Program). He is the Head of Photocatalyst Laboratory at the Universitas Halu Oleo, Kendari, Indonesia. He has published more than 20 papers in reputed journals and has been serving as a Commissioner of Environmental Impact Analysis of the Province of Southeast Sulawesi, Indonesia.

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