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Effect of Caustic Soda Fusion Temperature on Malaysian Xenotime

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Xenotime is mineral rich in rare earth element (REE), mostly contain phosphate mineral which is a rich with yttrium source. Alkaline fusion method was used to devote the study of the preparation of thorium and rare earth. This method could minimize radioactive waste volume, using diluted acid for dissolution and recover phosphate as by product. The method studied included caustic soda fusion, solid and liquid separation and leaching process. The raw material used was a concentrate containing about 60% to 75% total rare earth oxides, 1 to 2% thorium oxide, and 23 to 26% phosphorus pentoxide. Different ratio of Xenotime mineral and NaOH (1:0; 1:1; 1:2 and 2:1) was studied and undergo fusion at different temperature (400, 500, 600 and 700 °c). The resulting powder was analyzed by X-ray diffraction (XRD), X-ray Fluoresce (XRF), particle size analysis (PSA), Field Emission Scanning Electron Microscope (FESEM), Raman Spectrometry and Simultaneous Thermal Analysis (STA). It is possible to extract almost 90% of thorium, rare earths and phosphate by these processes.

Country or International Organization

Malaysia

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