

EXTRACTION OF TITANIUM DIOXIDE FROM PT BANGKA MINERAL ABADI ILMENITE USING SODIUM CARBONATE CAUSTIC FUSION METHOD

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ABSTRACT

The extraction of titanium dioxide (TiO_2) from ilmenite using sodium carbonate caustic fusion was conducted in this research. It aimed to study the effect of hydrochloric acid (HCl) concentration on the leaching processes, the effect of prolong leaching time on TiO_2 enrichment, and the effect of pre-treatment of ilmenite using caustic fusion with sodium carbonate (Na_2CO_3) on TiO_2 enrichment.

The research began with the characterization of ilmenite using X-ray diffraction (XRD) and X-ray fluorescence (XRF) analysis. The ilmenite then underwent pre-treatment using various Na_2CO_3 ratios for solid-phase reaction in a high-temperature furnace. The resulting ilmenite slag was subsequently leached using different concentrations of HCl and varying leaching times. This was followed by the hydrolysis of the separated leachate and the calcination of precipitates to obtain titanium dioxide crystals. Material characterization of the extracted compounds was performed using XRF, XRD, and the determination of concentrations using Atomic Absorption Spectroscopy (AAS), and UV-Vis Spectroscopy to identify remaining dissolved elements.

It was concluded that titanium dioxide extraction increases with higher HCl concentration, increased Na_2CO_3 to ilmenite ratio, and longer leaching times until reaching optimum values for each parameter. The maximum extraction of titanium dioxide using this research method was achieved at 61.65% when 6 M hydrochloric acid was used with a 6-hour leaching time and a 1.5:1 ratio of Na_2CO_3 to ilmenite. While the extraction of titanium dioxide was successful under certain parameters, another method for extracting dissolved titanium from the leachate solution should be developed for further research.

Keyword: hydrochloric acid, ilmenite, sodium carbonate, titanium dioxide.