ISERME 2024 Proceedings
2nd September 2024 – Sapporo, Japan
https://doi.org/10.31705/ISERME.2024.33

Feasibility Study of Iron Extraction from Laterite

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Abstract

This study investigates the feasibility of extracting iron from laterite, a low iron-bearing rock, with a focus on the economic viability of the process. The aim to develop a feasible method to extract Iron from Lateritic rock. The laterite samples were collected from Panirendawa, Pelpitigoda and Padukka. Mineralogy of the laterite was investigated by means of X -ray Diffraction (XRD) analysis, whereas chemical composition of the sample was determined by using Energy Dispersive X-ray analysis (EDX). The pelletization process was used to enhance iron recovery. Economic viability is evaluated through a detailed cash flow analysis that considers operating costs, revenue from iron extraction, and potential market factors. Iron extraction was done using the laboratory type cupola. The main results indicate that laterite contains significant iron content within the range of 30-40% and aluminium 25-27%. The cash flow indicates it is not a potential source for extraction iron only, however using a zero wastage multi-disciplinary process, slag can be used to produce bricks because of high aluminium silicate content of the slag. In conclusion, this study establishes the feasibility of iron extraction from laterite, showcasing it's not an economical process however using a zero wastage multi-disciplinary process it is economically viable.

Keywords: Laterite; Pelletization; Minerology; Economic viability; Slag