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活化焙烧强化盐酸浸出红土矿的镍

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摘要: 通过X线衍射、红外光谱、差热、扫描电镜和液氮吸附等方法考察活化焙烧对红土矿相结构变化和有价金属浸出的影响。研究表明: 该矿在277 °C左右发生了针铁矿脱水转变为赤铁矿, 在610 °C发生蛇纹石去羟基化作用, 该结果与通过XRD表征的在不同温度下进行焙烧的矿石中主要矿相的晶型转变结果一致; 矿物在300 °C焙烧时, 比表面积为21.04 m²/g, 在610 °C焙烧时, 比表面积为26.45 m²/g, 比原矿的比表面积16.03 m²/g有较大提高, 有助于后续的浸出过程; 在300 °C焙烧后, 矿样浸出可以获得最大的镍浸出率, 达93%, 而铁的浸出减少, 进一步升高焙烧温度不利于有价金属镍的浸出。

关键字: 红土矿; 镍; 活化焙烧; 浸出; 盐酸; 矿相重构

Enhancement of nickel extraction from laterite in hydrochloride acid through activated roasting

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Abstract: Enhancement of nickel extraction via activated roasting treatment of laterite and subsequent acid leaching was investigated by X-ray diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, difference temperature analysis (DTA), scanning electron microscopy (SEM) and N₂ adsorption techniques. The results show that there are two main phase transformation processes including goethite to hematite at roasting temperature 277 °C and lizardite dehydroxylation at roasting temperature 610 °C, which accord with phase transformation of laterite minerals roasted at different temperatures investigated through X-ray powder diffraction (XRD). The specific surface area of roasted ore are 21.04 m²/g with 300 °C and 26.45 m²/g with 610 °C contrast with that of raw ore of 16.03 m²/g, which is greatly favorable to the subsequent leaching. Through leaching experiments of different roasted ores comparing with raw ore, increasing the temperature up to 300 °C for laterite, the optimum nickel recovery of 93% is obtained and the leaching of iron decreases, and further heating is not helpful to the nickel recovery.

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