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在压力场下从石煤中提取五氧化二钒的工艺

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摘要: 对贵州某地石煤进行加压酸浸提钒实验研究。在压力场条件下考察几种主要因素对钒浸出率的影响。得到的最佳技术条件为: 反应时间3 h, 硫酸质量浓度200 g/L, 浸出温度180 °C, 搅拌转速580 r/min; 在此条件下, 钒浸出率(质量分数)为76%。两段逆流浸出实验结果表明: 钒浸出率可达90%以上。浸出液经过废酸回收、还原、调整pH等预处理后, 采用溶剂萃取的方法能够有效地分离和富集钒, 钒萃取率可达98.1%, 反萃率为99.14%; 用氨水沉淀反萃液中的钒, 沉淀物(多聚钒酸铵)在550 °C煅烧3 h即可产出纯度为99% V_2O_5 ; 全流程钒回收率为85%左右。

关键字: 钒; 石煤; 加压酸浸; 溶剂萃取

Technics for vanadium pentoxide extraction from black shale in pressure field

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Abstract: The extraction of vanadium from black shale in Guizhou was investigated by pressure acid leaching. The effects of main factors on leach recovery were investigated in pressure field. Optimum parameters for the leaching of vanadium for one-step leaching are: reaction time of 3 h, sulfuric acid concentration of 200 g/L, leaching temperature of 180 °C and stirring speed of 580 r/min. Under these conditions, about 76% vanadium is recovered. A two-step countercurrent leaching process is developed, and the vanadium recovery of 90% is obtained. Vanadium in the leachate is efficiently separated and enriched by solvent extraction after several preprocesses namely. The extraction and stripping yields of vanadium are 98.1% and 99.41%, respectively. Ammonia is employed to precipitate vanadium in the stripping liquor, subsequently and then the precipitates (ammonium poly-vanadate) are calcined at 550 °C for 3 h to produce 99% V_2O_5 . The overall yield of vanadium through all process stages is about 85%.

Key words: vanadium; black shale; pressure acid leaching; solvent extraction

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