

Research on Recovery Process of Ultrafine Molybdenum Metal from Waterjet Cutting Molybdenum Waste Sand

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Abstract

A resource recovery study was conducted on low-grade waste sand (Mo content 0.3%–0.6%, mainly composed of garnet and ultrafine molybdenum powder) generated from waterjet cutting of molybdenum plates. Process mineralogy analysis showed that molybdenum is primarily enriched in the ultrafine fraction below 30 μm . The recovery performance of a physical method ("gravity separation – electrostatic separation") and a chemical method ("water leaching – calcium precipitation") were compared. Results indicated that the physical method is limited by the "size effect," making it difficult for the concentrate molybdenum grade to exceed 3% in continuous industrial production. Based on the easy oxidation characteristic of ultrafine molybdenum powder, this study proposed a "physicochemical combined" process of "classification – calcium precipitation – gravity separation." This process achieved an overall molybdenum recovery rate greater than 85%, and the product (calcium molybdate) with a content of 67.92% was successfully prepared, which can be used as a blending raw material for ferromolybdenum smelting.

Keywords

Molybdenum-bearing Waste Sand, Gravity Separation, Electrostatic Separation, Molybdenum Leaching, Calcium Molybdate