

Optimasi Proses Pemurnian Pasir Silika Bangka menjadi Low-Iron Silica Sand Kualitas Ekspor dengan Metode Ultrasonik = Optimizing the Purification Process of Bangka Silica Sand into Export Quality Low-Iron Silica Sand through the Ultrasonic Method

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Abstrak

Provinsi Kepulauan Bangka Belitung memiliki 78,6 juta ton cadangan terukur pasir silika. Pengolahan pasir silika sebagai produk samping dari penambangan timah berpotensi menciptakan peluang ekonomi daerah. Saat ini, pengolahan pasir silika di Kabupaten Bangka menghasilkan 90-95% SiO₂. Sementara itu, permintaan global untuk pasir silika dalam industri kaca diproyeksikan meningkat hingga 2025, dengan persyaratan kemurnian 99,500-99,999% SiO₂. Oleh karena itu, diperlukan peningkatan kadar pasir silika untuk memenuhi syarat ekspor sebagai low-iron silica sand, yang juga diatur dalam Permendag RI Nomor 12 Tahun 2022 (>99,500% SiO₂ dan 0,012% Fe₂O₃). Peningkatan kadar pasir silika dapat dilakukan dengan penggunaan ultrasonik untuk membebaskan pengotor yang inheren. Material pasir silika yang digunakan dari Bangka dan berukuran -30+100 mesh, dengan kemurnian 74,720% SiO₂ dan 97,840% SiO₂ (ICP-OES). Pengolahan pasir silika dapat dilakukan dengan rangkaian metode washing, classifying, intensive scrubbing (ultrasonic), gravity concentrating, magnetic separation, dan natural drying. Pasir silika masukan dengan 97,840% SiO₂ dan 0,050% Fe₂O₃ berhasil diolah menjadi produk low-iron silica sand, yakni 99,600% SiO₂ dan 0,011% Fe₂O₃. Dengan demikian, pasir silika di Kabupaten Bangka berpotensi diolah dan diekspor sehingga mampu menjadi sumber pendapatan negara.

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The Bangka Belitung Islands province has a measured reserve of 78.6 million tons of silica sand. Processing silica sand as a byproduct of tin mining has the potential to create economic opportunities for the region. Currently, silica sand processing in the Bangka Regency yields 90-95% SiO₂. Meanwhile, the global demand for silica sand in the glass industry is projected to increase until 2025, with purity requirements of 99.500-99.999% SiO₂. Therefore, an increase in the silica sand content is needed to meet the export requirements as low-iron silica sand, which is also regulated in the Indonesian Trade Minister Regulation No. 12 of 2022 (>99.500% SiO₂ and 0.012% Fe₂O₃). The increase in silica sand content can be achieved through the use of ultrasonic technology to remove inherent impurities. The silica sand material used from Bangka is sized -30+100 mesh, with purity levels of 74.720% SiO₂ and 97.840% SiO₂ (ICP-OES). Silica sand processing can be carried out through a series of methods, including washing, classifying, intensive scrubbing (ultrasonic), gravity concentrating, magnetic separation, and natural drying. Silica sand with an input of 97.840% SiO₂ and 0.050% Fe₂O₃ has been successfully processed into low-iron silica sand products, with 99.600% SiO₂ and 0.011% Fe₂O₃. Thus, silica sand in the Bangka Regency has the potential to be processed and exported, becoming a source of national revenue.