Quantitative recovery of high purity nanoporous silica from waste products of the phosphate fertilizer industry

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Abstract

This study reports on the quantitative recovery of high purity nanoporous silica from wastes material (H_2SiF_6) of the phosphate fertilizer industry and $Na_2O{\cdot}SiO_2$. The silica recovered from the wastes was compared with silica from the reaction of H_2SO_4 and $Na_2O{\cdot}SiO_2$ because H_2SO_4 is commonly used. The product recovered from the wastes material and H_2SO_4 were 99.3% and 99.1% pure, respectively. The quantity recovered were 22.30 g and 20.11 g, respectively. The product had superior properties suitable for applications such as chromatography, reinforcing material for rubber and plastics. The process may significantly reduce the release of SiF_4 gas into the environment.

Keywords: Quantitative; Recovery; Nanoporous silica; Hexaflorosilicic acid; Sodium silicate