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Valorization of Gypsum as Industrial Waste

Authors : Hasna Soli

Abstract : The main objective of this work is the extraction of sulfur from gypsum here is industrial waste. Indeed the sulfuric acid production, passing through the following process; melting sulfur, filtration of the liquid sulfur, sulfur combustion to produce SO_2, conversion of SO_2 to SO_3 and SO_3 absorption in water to produce H_2SO_4 product as waste $CaSO_4$ the anhydrous calcium sulfate. The main objectives of this work are improving the industrial practices and to find other ways to manage these solid wastes. It should also assess the consequences of treatment in terms of training and become byproducts. Firstly there will be a characterization of this type of waste by an X-ray diffraction; to obtain phase solid compositions and chemical analysis; gravimetrically and atomic absorption spectrometry or by ICP. The samples are mineralized in suitable acidic or basic solutions. The elements analyzed are CaO, Sulfide (SO_3), Al_2O_3, Fe_2O_3, MgO, SiO_2. Then an analysis by EDS energy dispersive spectrometry using an Oxford EDX probe and differential thermal and gravimetric analyzes. Gypsum's valuation will be performed. Indeed, the $CaSO_4$ will be reused to produce sulfuric acid, which will be reintroduced into the production line. The second approach explored in this work is the thermal utilization of solid waste to remove sulfur as a dilute sulfuric acid solution.

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