

عنوان مقاله:

تولید کربنات کلسیم خالص با استفاده از گچ

محل انتشار:

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خلاصه مقاله:

Increasing fossil fuel consumption due to industrialization and development of many countries in the 21st century emits more greenhouse gases (GHGs) and in particular carbon dioxide (CO₂) into atmosphere. These activities have increased the concentration of the major component of the GHGs from 280 ppm in the 1750s to 396.8 ppm in 2013. Mineral carbon dioxide sequestration provides a leakage free and permanent method of CO₂ disposal to produce environmentally benign and stable solid carbonates. Natural minerals and industrial by-products rich in calcium (Ca) and magnesium (Mg) are the most favorable feedstocks for mineral carbonation processes. Flue gas desulfurization (FGD) gypsum as a source of calcium was proposed as the potential feedstock in this study. The purpose of this laboratory study was to investigate the effect of reaction parameters such as CO₂ pressure, reaction temperature, particle size, ammonia solution concentration, reaction time, and solid to solution ratio on calcium carbonate purity through Mersberg process. Increasing the reaction temperature as well as the pressure was very effective in improving the calcium carbonate purity. High purity calcium carbonate was produced when reaction temperature was increased to 400 °C and 70 bar, resulting in 93% and 94% purity, respectively. Experimental results showed that reducing particle size was also effective in enhancing the calcium carbonate purity in which the smallest particles produced higher purity calcium carbonates rather than larger particles. Increasing the reaction time from 30 to 60 minutes resulted in further completion of the reactions and better conversion of calcium into carbonate form.

کلمات کلیدی:

FGD Gypsum, CaCO₃, High purity, Mersberg process, CO₂ sequestration

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