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CO2 Sequestration by Mineral Carbonation in Ambient Air: Wollastonite Ratio

Carbon dioxide in our atmosphere has become an increasingly important issue- as are the methods to reduce the content in the air. Carbon sequestration by mineral carbonation (direct aqueous) utilizes high temperatures, intense pressures, water (H20), and wollastonite (CaSiO3) to stimulate a reaction that produces CaCO3 (calcium carbonate) and SiO2 (sand). A process normally utilized for flue gases, the potential of ambient air sequestration is dependent on how the wollastonite ratio in the water solution. Testing this premise would require an autoclave to produce the heat and pressure with the wollastonite and water mixture inside at different ratios, ex. 1:5 (60 grams of wollastonite per 300 mL of water is the proven ratio for flue gases to react the maximum amount of CO2). I found that that ratio that produced the largest average of CaCO3 and SiO2 was 1:5; but a systematic error of 20.90 grams was found due to the difficulty with separating the water from the products. An evaluation of the process concluded that the difficulty with separating water from byproduct, differentiating reactants and byproducts, and the disposal of the byproduct limited the method's efficiency and rendered it unpragmatic for use. In ambient air, carbon sequestration by mineral carbonation is an innovative but impractical method for near future sequestration of CO2.