

Carbon Capturing

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Calcium Carbonate [CaCO_3] is a commonly found chemical compound that has the ability to be transformed into a substance that will readily absorb Carbon Dioxide [CO_2] from ambient air and free flowing water. In recent years [CO_2] has been known to be one of the most dangerous gases present in the atmosphere and has caused oceans pH to drop as well as a global rise in temperatures. [CaCO_3], when heated, forms Calcium Oxide [CaO], a sorbent¹, and a byproduct of [CO_2]. The [CO_2] released from the reaction is captured in [H_2O] to create Carbonic Acid [H_2CO_3]. The [CaO] will readily dissolve in water creating Calcium Hydroxide [$\text{Ca}(\text{OH})_2$], a more powerful sorbent¹ than [CaO]. [$\text{Ca}(\text{OH})_2$] captures [CO_2] that it encounters, with no addition of energy. After the collection of [CO_2], [$\text{Ca}(\text{OH})_2$] becomes [CaCO_3] again. The [CaCO_3] formed can be heated again creating a cycle² that will lead to a net decrease in [CO_2] present in the atmosphere. The proposed sorbent will not only work to capture atmospheric [CO_2], but will also work in deacidifying oceans. The cycle² illustrated and depicted in the paper reduces approximately 0.43966 grams of [CO_2] for every gram of [CaCO_3] used; simply a 1 mole to 1 mole ratio was calculated between [CaCO_3] and [CO_2]. Removing all of the [CO_2] in the atmosphere would be devastating to numerous organisms, implying that the number of cycles² will be far lower than the estimated value of approximately 80 billion. The proposed Calcium cycle² produces large quantities of [H_2CO_3] which can be used in production of goods for consumption, and in electrolysis reactions to create carbon nanofibers. The cycle² can be industrialized and can be utilized to create a small amount of energy while also reducing [CO_2] levels in the atmosphere.