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AN OVERVIEW OF ACCELERATED CARBONATION OF COAL COMBUSTION FLY ASH FOR ATMOSPHERIC CO2 SEQUESTRATION AND SOIL AMENDMENT

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ABSTRACT

Fly ash is one of the most common solid by-products of coal combustion for electricity production. Currently, the majority of fly ash produced throughout the globe is discarded as trash with no practical use. Only a tiny percentage of overall fly ash output is utilized in cement manufacture, mineral wool manufacturing, metal recovery, road sub-base construction, mine reclamation, and agriculture. Furthermore, fly ash is a substance that may be utilized to collect and store CO2 in the atmosphere via mineral carbonation, both in situ and ex situ of the source of CO2. Accelerated carbonation has recently been investigated by scientists as a method of boosting the pace of mineral carbonation. In addition to attaining the advantages of carbon sequestration, rapid carbonation may render fly ash chemically stable, which can help overcome issues with hazardous element leaching when used as a soil supplement. As a result, this solid waste material may be effectively handled via rapid carbonation followed by addition to soil. The mineralization process's effectiveness is determined by the mineralogy, physical and chemical characteristics of fly ash, and reaction circumstances such as CO2 partial pressure, temperature, relative humidity, and gas-to-material contact time. It is critical to choose material with the necessary characteristics and to provide it with the optimal reaction conditions in order to achieve greater CO2 sequestration efficiency. The major problems surrounding the accelerated carbonation of coal combustion fly ash under various reaction circumstances and its impact on CO2 sequestration efficiency are discussed in this article. It also highlights the possibility of using carbonated fly ash to enhance the physical and chemical characteristics of soil.

KEYWORDS: *Carbonation, CO2Sequestration, Coal Fly Ash, Metal Leachability, Soil Amendment.*

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