



# 7<sup>th</sup> INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“CLEANER PRODUCTION FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS”

## Carbon Capture and Utilization by Mineral Carbonation with CKD in Aqueous Phase: Experimental Stage and Characterization of Carbonated Products

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### Abstract

Carbon dioxide capture and reuse techniques are being developed to reduce greenhouse gas (GHG) emissions from the industrial sector at the same time that high added value by-products are obtained. Carbon capture by mineral carbonation of CO<sub>2</sub> using industrial waste is an interesting technology. Its rate and effectiveness depends on four main parameters: water content of the sample (or amount of mixed water or liquid/solid ratio), particle size, temperature, and pressure. Cement kiln dust, which is a residue of the cement industry, could be considered the most suitable material for this purpose, with a high calcium and magnesium content. We used a response-surface experimental design model to assess CO<sub>2</sub> carbonation mineral techniques and determine its uptake potential, and the products' physical-chemical and mineralogical properties. Diffractogram showed that a carbonated phase was formed after the reaction, increasing the amount of calcium and magnesium carbonates. Theoretical uptake was calculated as 23.4% w/t, instead, experimental yield was found out between 7-22% compared to the theoretically amount of CO<sub>2</sub> sequestration.

*Keywords: carbon capture and utilization, cement kiln dust, industrial waste, mineral carbonation.*