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**Title of Presentation : Acid leaching of Calcium from Phosphogypsum for Potential Indirect Mineral Carbonation Application**

**Presentation Abstract:**

Note: It is recommended that a tentative title of the presentation and abstract should be

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**Acid leaching of Calcium from Phosphogypsum for Potential Indirect Mineral Carbonation Application**

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**ABSTRACT** – Continuous increase in the CO2 emissions for the past years drive the development of carbon capture, utilization, and sequestration (CCUS) technologies. Under CCUS, mineral carbonation has been one of the most promising methods for carbon sequestration. Mineral carbonation highlights the valorization of mineral waste, usually rich in Ca or Mg, to form stable carbonates. Current developments in mineral carbonations focus on indirect mineral carbonation which involves the extraction of Mg2+ or Ca2+ ions, usually under acidic conditions. The Ca- or Mg-rich leachate then reacts with CO2 to form CaCO3 or MgCO3. Phosphogypsum (PG), a waste by-product from wet phosphoric acid production for fertilizers, is being explored for its potential use for carbon sequestration through indirect mineral carbonation. PG samples were obtained from a fertilizer production plant in the Philippines and was characterized via XRD, XRF, and SEM-EDS. PG is primarily composed of Ca which may be leached out for carbonation. HCl was used as a leaching agent to extract Ca2+ ions from PG. Using response surface methodology, HCl concentration, leaching time, temperature, and liquid-to-solid ratio were optimized to maximize calcium extraction efficiency. The optimal conditions (2.3 M, 62 °C, 60 min, L/S Ratio 26) yielded a maximum calcium extraction efficiency of 77.70%. This emphasizes the high feasibility of PG as calcium source for indirect mineral carbonation.

**Keywords:** Phosphogypsum, indirect mineral carbonation, carbon sequestration, leaching, HCl, response surface methodology, optimization