

Vaterite formation from aqueous carbonation of gypsum for CO₂ capture and utilisation

CARLOS PIMENTEL¹, GERMAN MONTES-HERNANDEZ²
AND ALEXANDER E.S. VAN DRIESSCHE³

¹ISTerre, Univ. Grenoble Alpes

²ISTerre, CNRS

³IACT, CSIC-UGR

Presenting Author: carlos.pimentel-guerra@univ-grenoble-alpes.fr

Vaterite (CaCO₃) is a carbonate mineral with several industrial applications, including use in personal care products, biomedical applications, and as a filler in cement materials [1]. A number of methods have been proposed to synthesis vaterite, although they often involve the use of additives [2]. In this work, we have developed a synthesis method to produce pure vaterite at room temperature in a few minutes by only using powdered gypsum (CaSO₄·2H₂O) and a carbonate solution (Na₂CO₃, K₂CO₃ or a solution obtained by CO₂ capture). The precipitated vaterite is stable in solution for at least 24 hours. The obtained particles have a very homogeneous size (2 to 4 μm). The vaterite particles precipitated from K-bearing solutions have spherical shapes (Fig. 1A), while all others have irregular, angular, shapes (Fig. 1B). Considering the short reaction times required to obtain vaterite and the economic interest of this phase, this method constitutes a promising route to competently capture and reuse CO₂. During this presentation, an overview of the results will be given together with a discussion of possible future perspectives (e.g., use of waste gypsum or reuse of the final brines).

[1] F. Liendo, M. Arduino, F. A. Deorsola, and S. Bensaid, *Powder Technology* **398**, 117050 (2022).

[2] D. Konopacka-Lyskawa, *Crystals* **9**, 4 (2019).

