



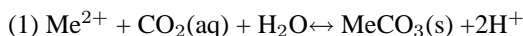
## **Homogeneous precipitation of metal carbonates (Ba, Ca, Cd, Pb, Zn) using a CO<sub>2</sub> diffusion technique: kinetics and characterization.**

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Crystals created in a precipitation process have the potential of being used as seed crystals during elimination of metals through precipitation with soda (Na<sub>2</sub>CO<sub>3</sub>). This method is used to remove harmful heavy metals like Pb, Zn, Fe and Cd from waste waters and polluted soils.

Calcite (CaCO<sub>3</sub>), Otavite (CdCO<sub>3</sub>), Hydrozincite [Zn<sub>5</sub>(OH)<sub>6</sub>(CO<sub>3</sub>)<sub>2</sub>], Hydrocerrusite [Pb<sub>3</sub>(CO<sub>3</sub>)<sub>2</sub>(OH)<sub>2</sub>], Cerrusite (PbCO<sub>3</sub>) and Whiterite (BaCO<sub>3</sub>) have been synthesized via the diffusion of CO<sub>2</sub> through polyethylene bottle into metal chloride or metal nitrate solutions. Homogeneous (unseeded) precipitation of metal carbonates in this system was investigated, according to the following overall reaction:



During experiments all solutions have been titrated with NaOH and pH has been kept constant by the titrator; every experiment has been carried out at 25 °C.

Measurements of pH, metal and sodium concentration, temperature were recorded over the time, while alkalinity was determined at the end of each experiment by a standard procedure of acid-base titration with HCl.

Liquid samples have been analyzed using ICP-AES in order to evaluate metal consumption in solution. Composition of solid phases has been characterized by means of FT-IR spectroscopy, X-ray diffractometry, scanning electron microscopy (SEM). Dispersion particle size analyzer has been used for measuring the distribution of dif-

ferent sizes of powder particles.

The kinetics of precipitation has been studied by recording NaOH titration curve and by development of metal composition of the solutions during the experiment.