



Effect of NTA and temperature on crystal growth and phase transformations of CaCO₃

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Received 12 August 2013; Accepted 5 January 2014

ABSTRACT

Phase transition from vaterite to calcite is a general behavior of CaCO₃ materials. The effect of nitrilotriacetic acid disodium salt (NTA) on the crystallization behavior and polymorphism of CaCO₃ was studied at different temperatures between 60 and 230 °C. The morphologies and the structure of the precipitates were characterized using scanning electron microscope, field emission scanning electron microscopy, powder X-ray diffraction, Raman spectroscopy, and Fourier transform infrared spectroscopy. It was observed that NTA could change the morphologies and crystal structures of CaCO₃ with temperature and stabilize least stable vaterite at high temperature. An anomalous conversion of calcite to vaterite in the presence of NTA was observed. The effect of amount of NTA added on the crystallization behavior at selected temperatures is reported.

Keywords: Crystal growth; Polymorphism; Vaterite; Scale inhibition

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