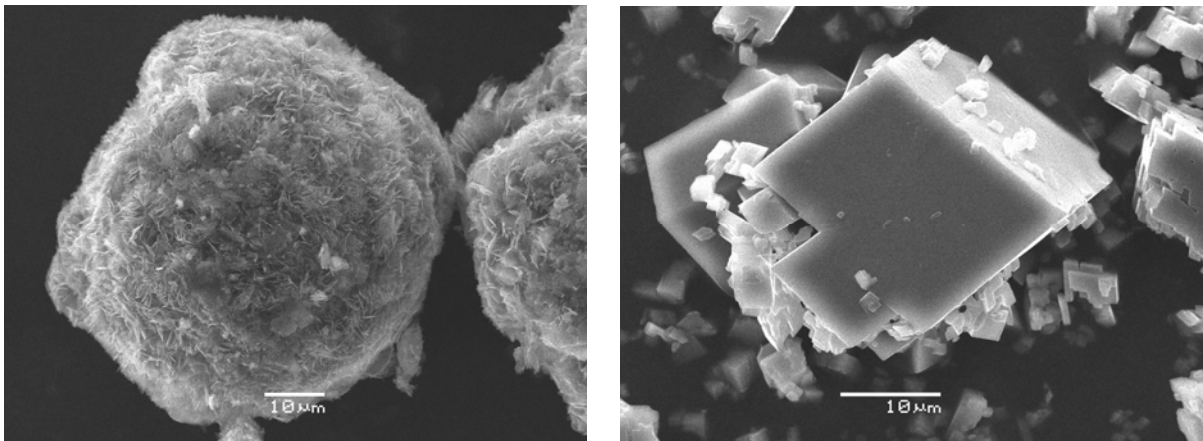


Reaction kinetics of Mg-carbonates

Report by U-N Berninger

Mineral scale formation is a common and costly phenomenon in many processes handling with aqueous solutions. Carbonate precipitation e.g. is responsible for lost efficiency in heat exchangers and boilers. The retrograde solubility of carbonates is the driving force to produce these scaling minerals. Nevertheless, Mg plays a crucial role in the carbonate system. While influencing precipitation rates of calcite and even being decisive for the final CaCO_3 polymorph formation, the formation of anhydrous Mg-carbonates seems to be inhibited.

To constrain the influence of Mg in the carbonate system a better understanding of the reaction kinetics of Mg-carbonates is needed. Main Mg-carbonates encountered in natural environments are e.g. dolomite and hydromagnesite. In order to investigate their reaction kinetics the first step was devoted to the respective synthesis of pure phases (see figures below). The second step will now focus on the interaction of aqueous solutions with these carbonates.



SEM-images: Leaf-like growth morphology of hydromagnesite after batch-reactor experiment at 75°C (left) in contrast to rhombohedral growth morphology of dolomite after batch-reactor experiment at 220°C (right).