# Time-lapse imaging of CaCO3 precipitation in nano-micro pores

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I will present results from time-lapse experiments where new advanced forms of Xray tomography are used to image, quantify and identify the growing phases of $CaCO_3$ inside A) a nanoporous structure with average pore size down to 10 nm using a double diffusion method; B) microporous quatz during continuous flow of a supersaturated solution. Results revealed that 1) nano porosity stabilizes metastable phases (measured by diffraction tomography), e.g. ACC, vaterite or aragonite, and can promote the overal growth rates; 2) phase transformation under confinement follows a dissolution / precipitation mechanism; 3) the dynamics of pore occlusion and consequent change of flow velocities are linked to a time-dependent growth kinetics of calcite within the evolving microporous structure. These results call for a rehapraisal of current mineral growth models in porous media whereby a better understanding of the dynamic changes within the pore structure is needed; and also set the path for using advanced forms of time-lapse Xray tomography across the nano and micron scales to study the effect of confinement in the time-dependency of the growth kinetics.