Thermomechanics of hydrogen storage in metallic hydrides: modeling and analysis

Prof. Dr. T. Roubíček (Charles University Prague, Czech Republic)

roubicek@karlin.mff.cuni.cz

A mathematical thermodynamically consistent model for hydrogen adsorption in metal hydrides is proposed. Beside diffusion of the hydrogen driven by the gradient of chemical potential, the model accounts for phase transformation between metal and hydrid, heat transfer, deformation under small strains, and damage. Existence of solutions of the underlying system of partial differential equations and inequalities is proved by limiting a carefully-designed, semi-implicit time-discrete scheme. The talk is based on a joint article with Giuseppe Tomassetti.