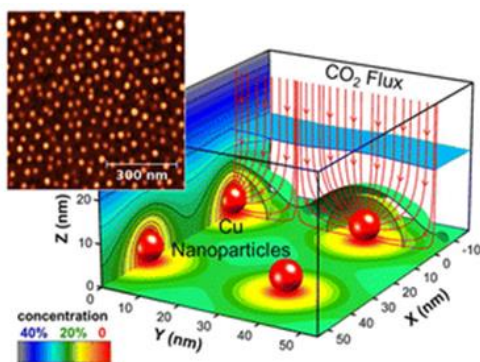




## The «Dark side» of catalysis: mutual shadowing of catalytic particles



### Motivation

Under diffusion-driven transport, catalytic particles «shadow» each other from reactants, if they are densely packed in the control volume. Catalytic «shadowing» results in the attenuation of the apparent rate coefficients compared to the values expected for an isolated active site. This phenomenon may have important implications for designing catalytic pellets and for measuring the intrinsic rates of catalytic reactions.

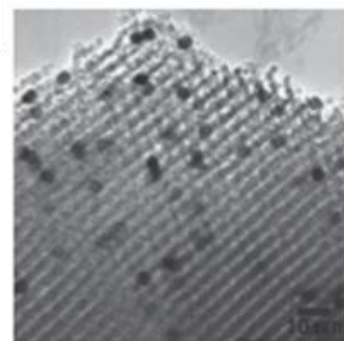
### Objectives and scope

- Fabricate a series of porous samples with different densities of well-defined catalytic nanoparticles (SiO<sub>2</sub> porous matrix with dispersed metal clusters)
- Measure the apparent rate coefficient of a test reaction under diffusion regime (TAP)

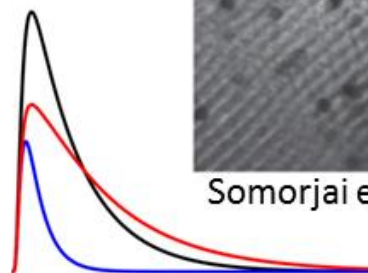
### Skills to be developed

- Deposition of nanoparticles into (meso)porous frameworks
- Time-resolved kinetic (TAP) measurements
- Complementary physico-chemical characterization of materials (XRD, N<sub>2</sub> adsorption, SEM, etc.)

3D nanoparticle array  
(7.1nm Pt nanoparticles in  
SBA-15)



Somorjai et al. (2008)



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