

ID: IUPAP Young Scientist Award

Title: IUPAP: Thermodynamic and kinetic effects in nano-catalysts

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Through practical examples, this presentation will describe the interplay between phases competing for stability at the nano-scale focusing on their effects on catalytic reactions. By leveraging the complex balance of power between surface-tension-stress and surface-energy contributions, we will address: 1) reduced solubility in iron nano-catalysts for carbon nanotubes production and thermodynamic limit of the growth [PRL 100, 195502] 2) size-induced viscosity -the kinetic counterpart of dynamic coexistence- with $\sim 1/R$ effects on reaction speeds (dynamic renormalization of the time frame) [ACS-NANO 4, 6950] 3) self-consistent variational approaches to the hierarchy of shape of nano-catalysts [ACS-NANO 5, 247 (2011)], and, if time allows, 4) size-dependent Wulff plots.