# Shape-controlled Nanoparticle SERS Platforms for Tracking of Chemical Reactions and Solid-Gas Interactions

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In this talk, I will discuss our group's effort in developing "plasmonic nose" capable for detecting trace level of gas molecules. By integrating metal-organic framework (MOF) and plasmonic nanoparticle array, I will discuss how real-time SERS can be used to directly observe the concentration of CO2 molecules into a quasi-condensed phase at a nanoscale interface, even at ambient conditions of 1 bar and 298 K. A systematic spectral evolution is observed throughout our time-dependent SERS studies, which enables us to experimentally visualize the in situ linear-to-bent transformation of CO2 at the solid-gas interface with increased gas accumulation over time. These direct observations highlight the advantage of surface-sensitive SERS in probing such sophisticated molecular dynamics occurring at the enclosed surface of solid@MOF system, offering valuable insights to further our understanding in solid-gas interactions at ambient operations.

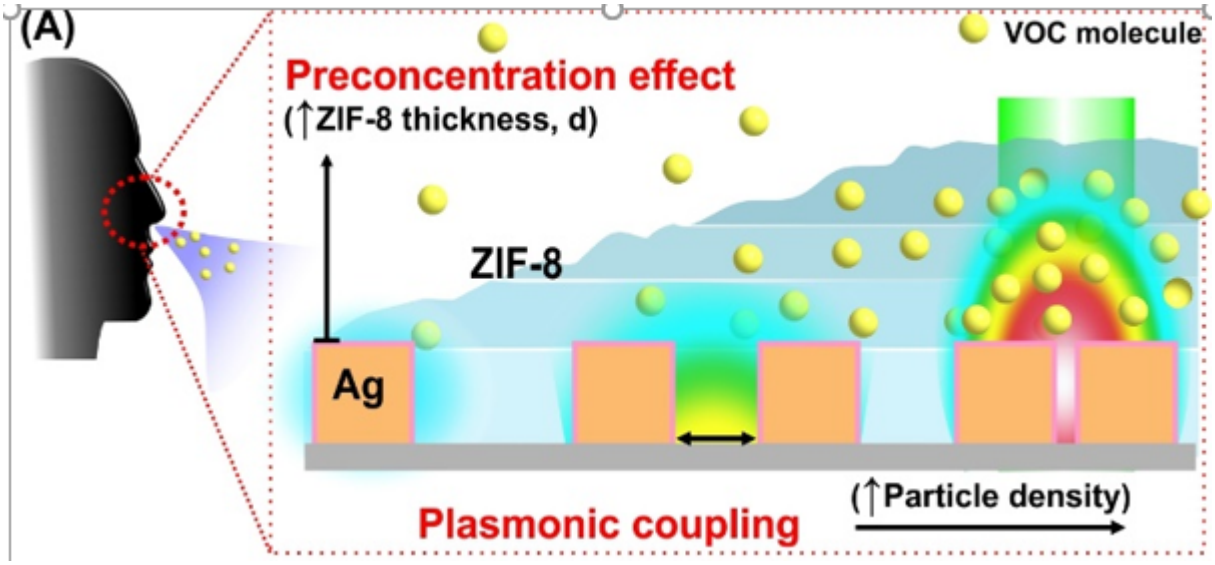


Figure 1. Scheme of "plasmonic nose", MOF-encapsulated shape-controlled nanoparticles for SERS applications.