ABSTRACT:

Nanostructured Single Atom Doped Catalysis for Designed Carbon Nanotubes Production from Research to Scale-Up: Insights and Technology Opportunities

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Metal Organic Framework is a well establish support platform for nanoparticle catalysis. When MOF allows surface to support enhanced electron sites and promotes catalysis, the effect of such plastforms are not being explored widely in new areas of catalysis such as photochemical and cold-hot plasma.
In our recent work we documented facile transformation of gas phase hydrocarbon and other more polluting reactants including CO2 to manufacturing nanostructured carbon as a co-product in a simultaneous activation of vacancy state of specific single atoms to produce hydrogen, methanol and DMEs. DFT and MDML study further elucidated the scope of expanding this single atom doping to create lower activation vacancy state and facilitated photochemical and photothermal processes in a wide range of wavelength.

Our talk will focus on optimization kinetics of several single atom doping state of metals and their selectivity on carbon nanotube production with carbon neutral hydrogen as a coproduct. We shall demonstrate our TRL 4 level technology scale up to produce CNT and application of nanostructured carbon in target specific applications including energy storage, electromagnetic shielding, abnormal dielectric and paramagnetic applications such as conductors.