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Polyoxometalate decorated Pt-nanoparticles and their hydrogen spillover studies

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In this study, monolayer polyoxometalate supported platinum nanoparticles (Pt⁰-NPs) were synthesized and characterized. Hydrogen spillover from the Pt⁰-NPs to the polyoxometalate (POM) shell was studied. Polyoxometalate is an industrially important and chemically interesting class of inorganic compounds due to their alterable physical and chemical properties. According to the literature, both POM and metal nanoparticles have their own properties. Since POMs are molecular anions, they can stabilize colloidal metal nanoparticles. The redox, catalytic and the photocatalytic properties of POMs can provide distinct reactivities to such POM stabilized metal nanoparticles. Hydrogen spillover effect of platinum and palladium nanoparticles has been reported earlier. Here, our aim is the synthesis of POM (H₃PW₁₂O₄₀) decorated Pt nanoparticles and their hydrogen spillover studies. The obtained POM stabilized Pt nanoparticles were analyzed and confirmed using a cryogenic transmission electron microscopy (Cryo-TEM). The hydrogen spillover effect was confirmed by kinetics studies using the stopped-flow method and characterized using P₃₁ NMR technique.

Biography

Aswin Kottapurath Vijay pursued his Master's Degree in Chemistry from the National Institute of Technology at Tiruchirappalli, India. Currently, he is a second-year PhD candidate at Ariel University, Israel. His current work is focused on "polyoxometalates decorated metal nanoparticles and their catalytic activities".

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