

Synthesizing silica supported silver nanoparticles at different pHs: tools for catalytic reactions investigationGifty Sara Rolly¹, Dan Meyerstein^{1, 2} and Tomer Zidki¹¹Ariel University, Ariel, Israel²Ben-Gurion University of the Negev, Beer-Sheva, Israel

Our work focuses on the synthesis of silica-supported silver nanoparticles in alkaline and acidic media to investigate the pH effect on different catalytic reactions. Supported metal nanoparticles are widely employed in catalysis. The direct application of metal nanoparticles in catalysis is quite inconvenient due to their small size and a high tendency to agglomerate. Thus, metal nanoparticles are deposited on suitable supports such as metal oxides, carbon materials, polymers, mesoporous silica, etc. Since metal-oxides' surface compositions depend on pH, it may affect the catalytic reactions pathways. We used 40 nm Stober's silica nanoparticles (hydrolysis of tetraethyl orthosilicate in ethanol-water mixtures in the presence of ammonia) as the support. The silica nanoparticles were functionalized using bridging molecules to facilitate the attachment of the silver ions. The reduction was carried out using sodium borohydride (a crucial step in the study) to form stable alkaline silica supported silver nanoparticles. The obtained supported silver nanoparticles were acidified using various methods until we got stable nanoparticles. Evident images of silver deposited on silica at different pHs are pictured in STEM microscopy. The synthesized supported silver nanoparticles can be used to investigate the pH effect on different catalytic reactions.

Recent Publications

1. Campelo J M, Luna D, Luque R, Marinas J M and Romero A A (2009) Chem Sus Chem 2:18–45.
2. Zhang, W., Wang, D. & Yan, R. Selective Nanocatalysts and Nanoscience 29–71 (Wiley-VCH Verlag GmbH & Co. KGaA, 2011).

Biography

Gifty Sara Rolly completed her Master's in Chemistry at the National Institute of Technology-Tiruchirappalli, India. She is currently a second-year PhD Research Student at Ariel University, Israel. Currently, her research focus is on the synthesis of "supported metal nanoparticles and their catalytic reaction investigation".

giftysrolly@gmail.com

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