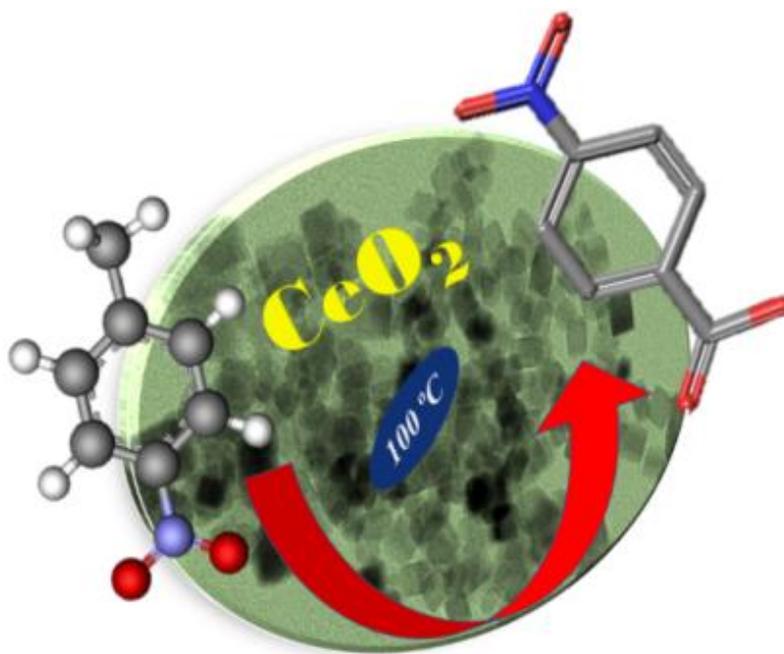


Selective oxidation of p-Nitrotoluene catalyzed by CeO₂ nanocubes under mild conditionsFarha Naaz[#] and Tokeer Ahmad *[#]* Nanochemistry Lab, Department of Chemistry, Jamia Millia Islamia (Central University)
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Abstract: Ceria being exploited as an active component for catalytic converter for treatment of exhaust gases occupies widespread attention in research on new catalysts with improved properties for organic synthesis due to its very rich chemistry and has become the subject of thorough investigations.[1] Acid-base and redox properties exhibited by ceria, either unaccompanied or in combination with transition metals plays important role in the activation of complex organic molecules and thus exhibits exclusive selective transformations. [2] Numerous organic reactions are actively catalyzed by pure ceria and ceria-based catalysts including hydrogenation of many unsaturated compounds, dehydration of alcohols, ketone formation, alkylation of aromatic compounds, aldolization and coupling or ring-opening reactions. [3] Here, we synthesize heterogenous nanocatalyst of ceria by a simple and cost-effective hydrothermal method and then explored it as an efficient catalyst in the oxidation of 4-nitrotoluene to its corresponding benzoic acid (Figure 1). The as-synthesized compound was characterized by XRD which revealed cubic fluorite structure of ceria, followed by other techniques like TEM, UV-vis DRS spectroscopy. To determine the surface area of the synthesized sample BET was performed. Further, Oxidation of para-nitrotoluene to the industrially important para-nitrobenzoic acid can be performed efficiently in the presence of a catalytic amount of nano sized cerium oxide under mild conditions at 100 °C in water. Initially, conversion process was monitored by TLC and further analysis of oxidized products was done by Mass, NMR and FT-IR.



5th International Conference on Nanotechnology for Better Living (NBL-2019), Jointly organized by National Institute of Technology (NIT) Srinagar and Indian Institute of Technology (IIT) Kharagpur; April 7 – 11, 2019 at SKUAST, Shalimar Srinagar, Jammu and Kashmir, India; Editor: Dr. M. A. Shah and Prof. P. Banerji, ISBN:978-81-939516-0-6; Published by Applied Science Innovations Pvt. Ltd., Pune, Maharashtra, India.

Figure 1: Diagrammatic representation of Nanostructured ceria catalyzed oxidation of p-nitrotoluene.

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