

Mineralization of Endosulfan from Water by Nonthermal Plasma: A Green Approach for Treatment of Pesticide Contaminated Water

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Supporting Information

1. Characterization of the ceria catalyst

1.1. Nitrogen adsorption-desorption isotherm

The N₂ adsorption – desorption isotherms shown in Fig. S1. The BET surface area of the ceria was deduced from adsorption – desorption isotherms it is around 89 m²/g and pore size 19.2 Å and pore volume 0.073 cc/g.

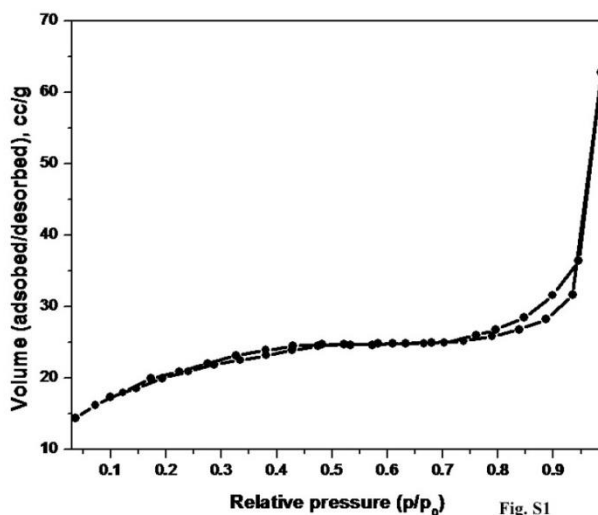


Fig.S1: Nitrogen adsorption and desorption isotherm of powder CeO₂ prepared by combustion synthesis.

1.2. X-ray diffraction

The formation of ceria fluorite structure was confirmed by XRD pattern as shown in Fig. S2 (JCPDF#810792). The crystal size calculated from the Debye-Scherrer method and it was found that the size of the synthesized CeO₂ is around 15 nm.

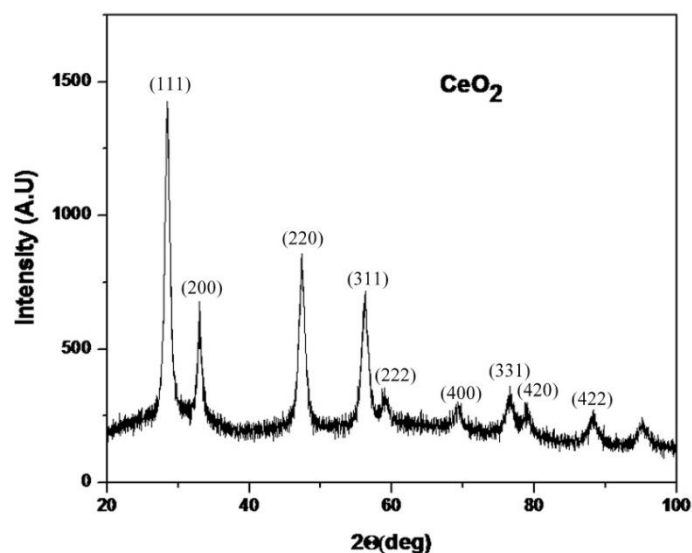


Fig. S2: XRD diffraction patterns of the CeO₂ catalysts

1.3. Raman spectroscopy

Raman spectroscopy is one of the powerful tools for characterization of ceria. The strong peak at 464 cm⁻¹ was assigned to F2g Raman active interior phonon mode of CeO₂ fluorite structure, whereas, the second peak around 600 cm⁻¹ was due to the presence defect induced oxygen vacancies (D-band) on the surface. The presence of Ce⁺³/Ce⁺⁴ (oxygen vacancies) is believed to be the cause of the high reactivity of CeO₂ for ozone decomposition catalyst.

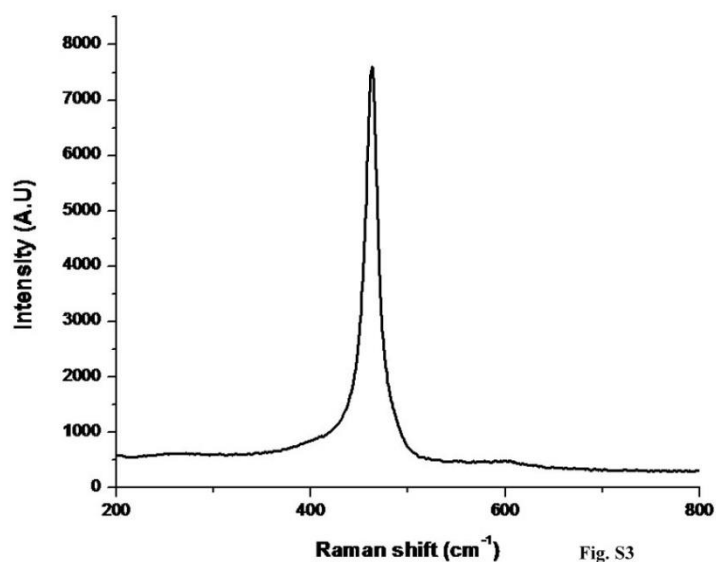


Fig. S3: Raman of the CeO₂ catalysts