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 A° and pore volume 0.073 cc/g.

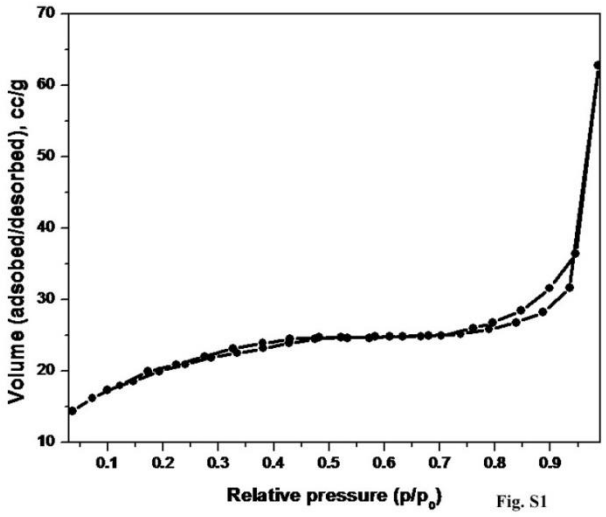

Fig.S1: Nitrogen adsorption and desorption isotherm of powder CeO_2 prepared by combustion synthesis.

1.2. X-ray diffraction

The formation of ceria fluorite structure was confirmed by XRD pattern as shown in Fig. S_2 **(JCPDF#810792)**.The crystal size calculated from the Debye-Scherrer method and it was found that the size of the synthesized CeO_2 is around 15 nm.

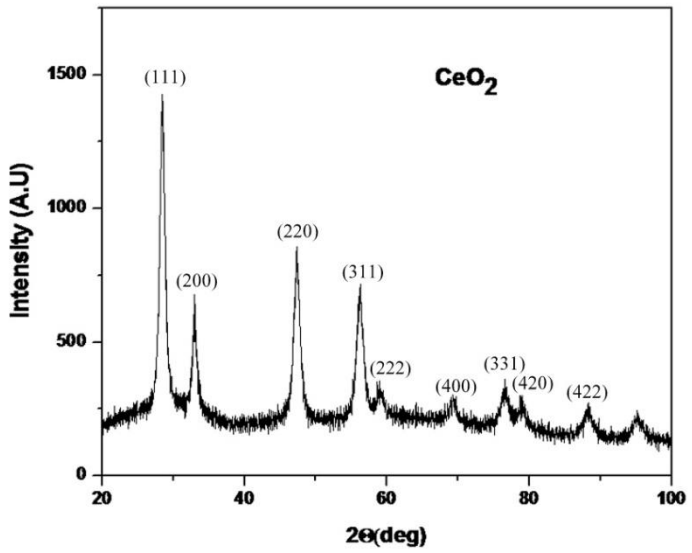

Fig. S2: XRD diffraction patterns of the CeO_2 catalysts

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 CeO_2 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 CeO_2 for ozone decomposition catalyst.

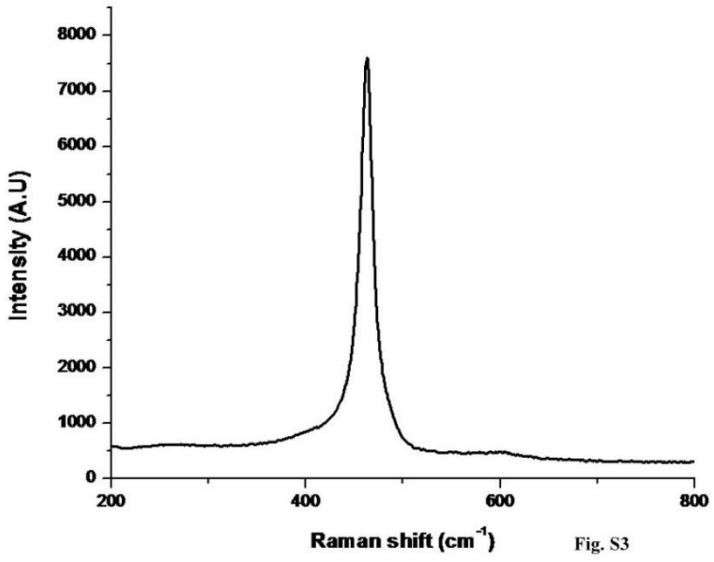

Fig. S3: Raman of the CeO_2 catalysts