Supporting information

Synergistic Impacts of Sonolysis Aided Photocatalytic Degradation of Water Pollutant over Perovskite-type $CeNiO_3$ Nanospheres

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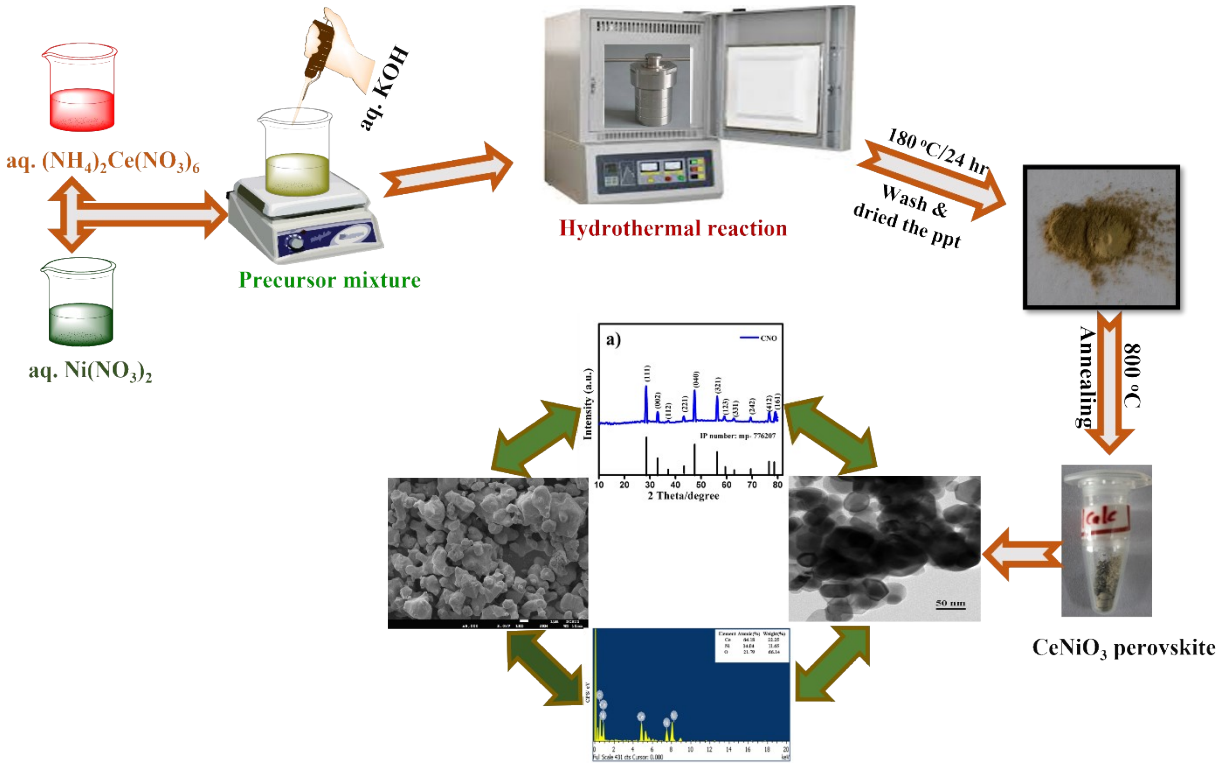

Scheme S1: Schematic exemplification of perovskite-type $CeNiO_3$ nanospheres formation.

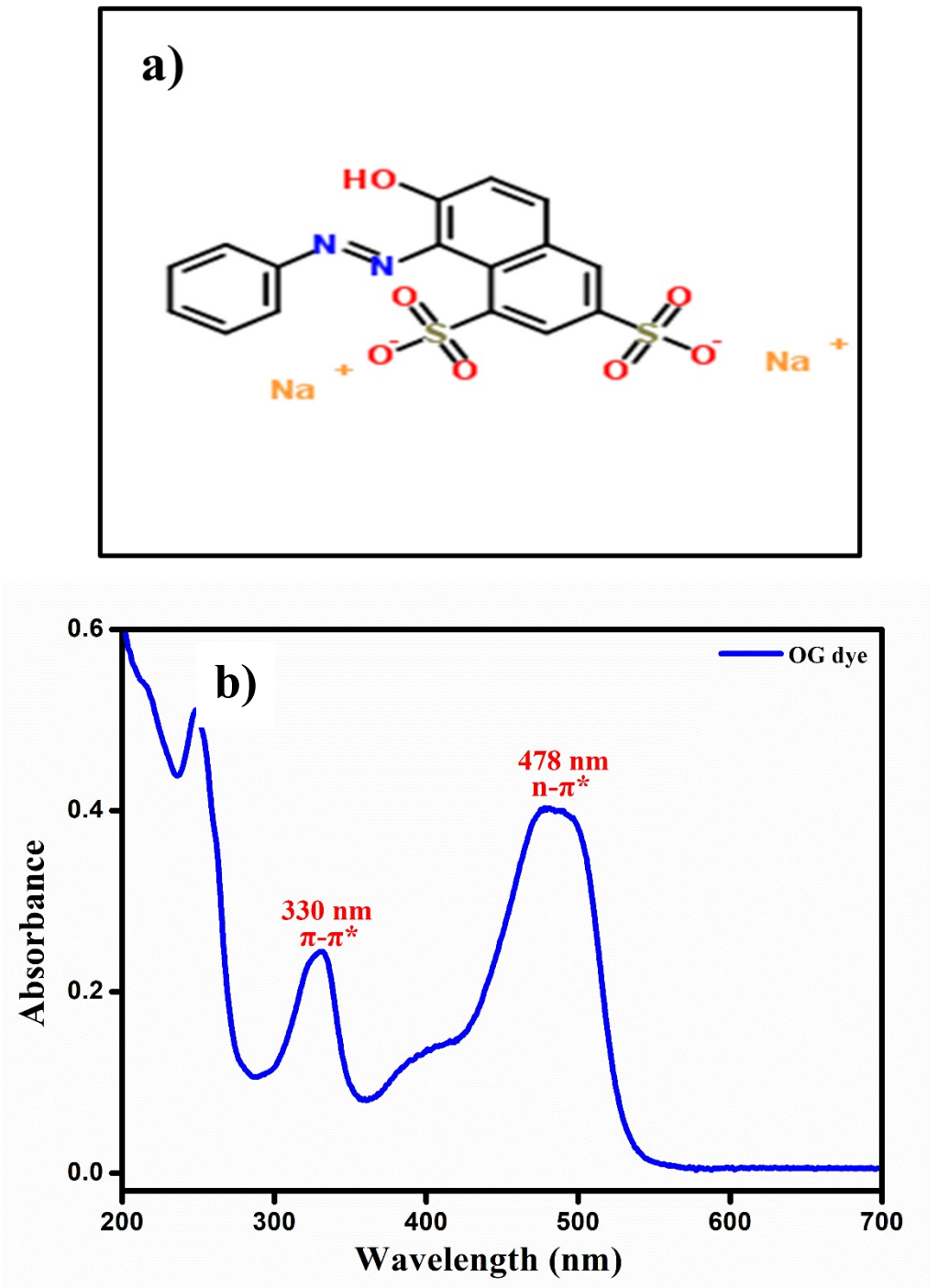

Fig. S1: (a) Molecular structure and **(b)** absorption spectra of OG dye.

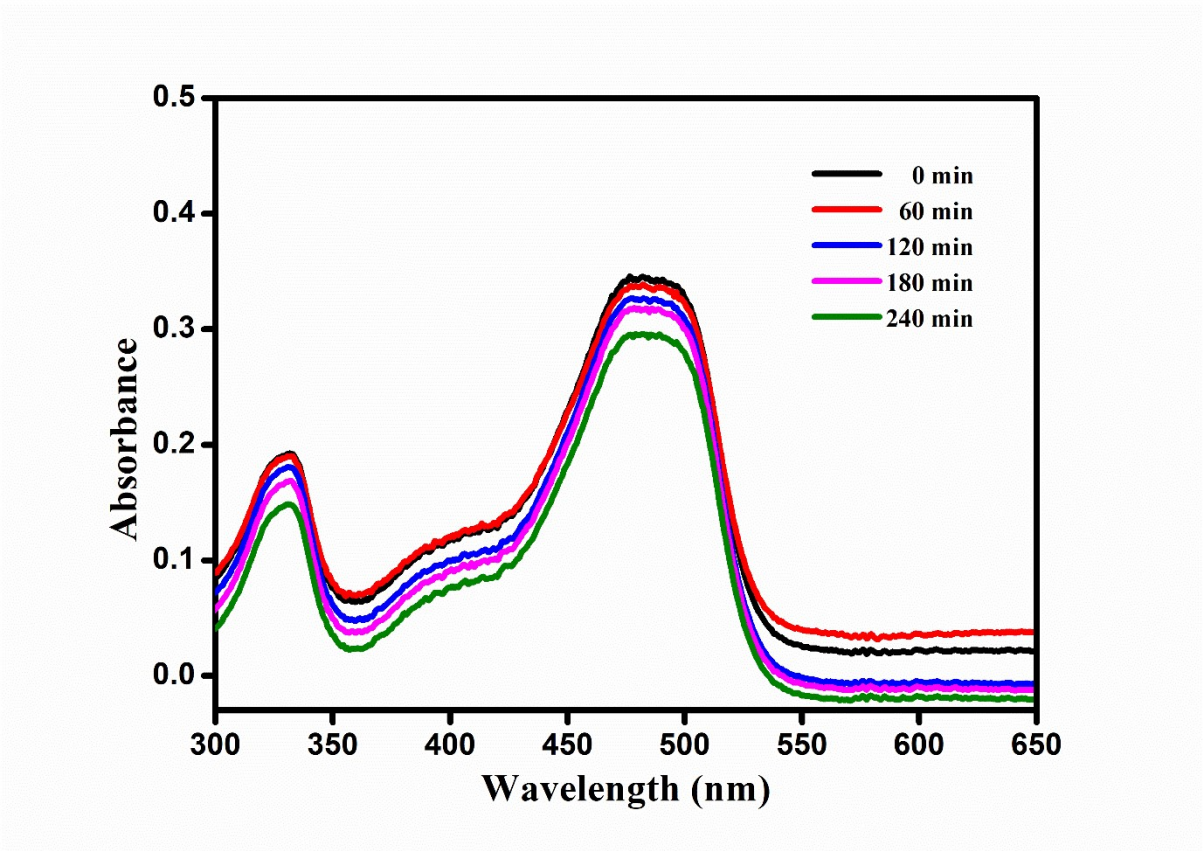

Fig. S2: Time-dependence UV-Vis absorption spectra of OG dye adsorption over CNO surface; (OG conc. 2 x10^{-5} M, 0.2 g/L catalyst loading at natural pH-9).

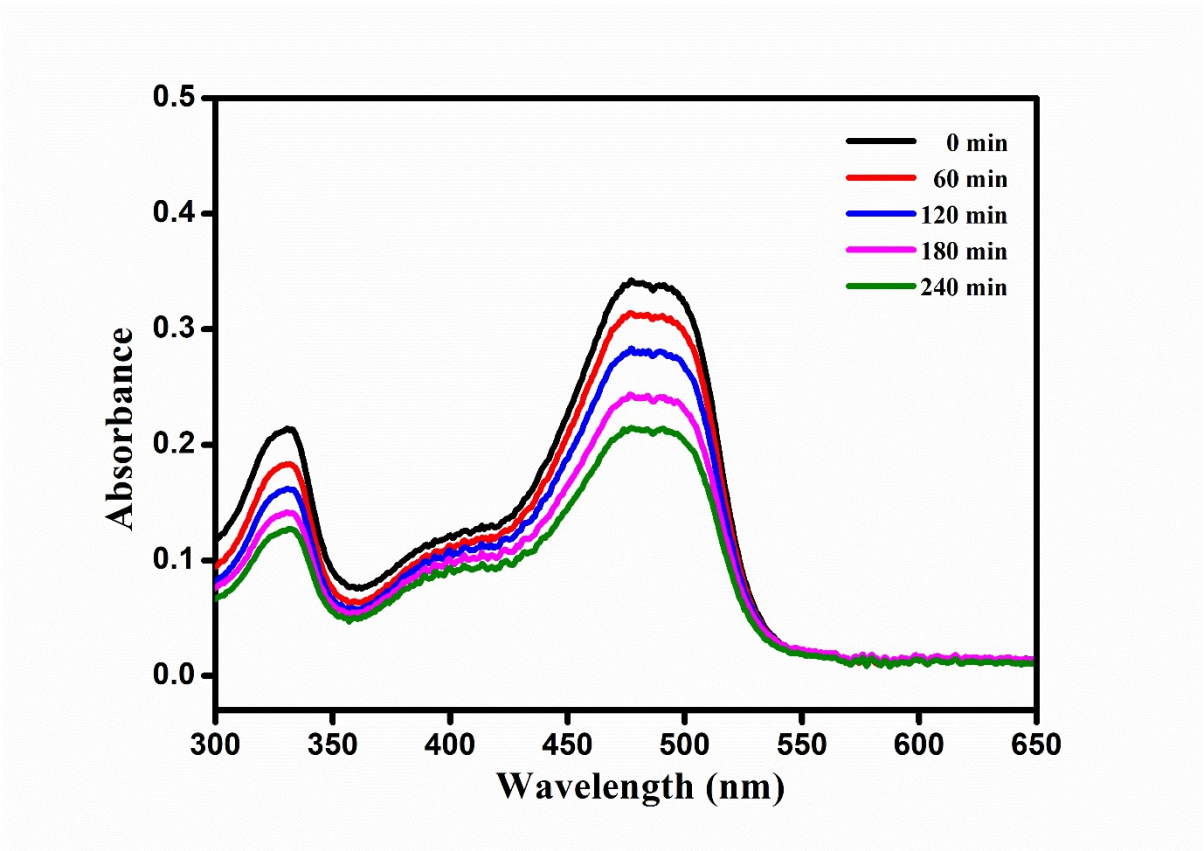

Fig. S3: Time-dependence UV-Vis absorption spectra of photocatalytic degradation OG dye over CNO catalyst under visible photon irradiation; (OG conc. 2 x10^{-5} M, 0.2 g/L catalyst loading at natural pH-9).

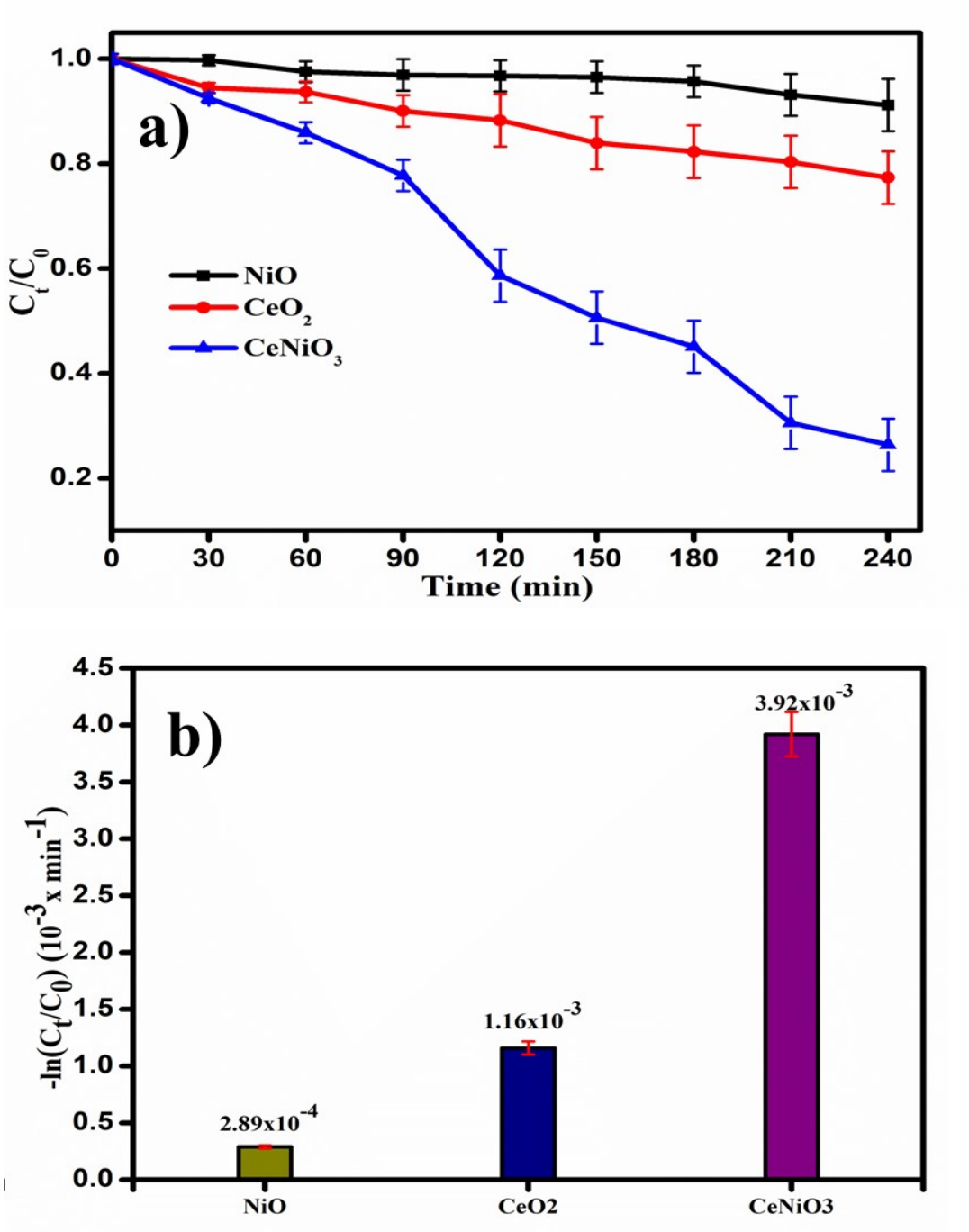

Fig. S4: a) Sonophotodegradation efficacy plot and **(b)** pseudo-first-order rate kinetics plot of OG dye using as-synthesized NiO, CeO_2, and CNO catalyst samples.

Table S1: Previous study on the synergistic influence of sonophotocatalytic degradation of azo dye.

Catalyst sample	**Irradiation source**		**Catalyst dosage**	**Orange-G dye concentration**	**Degradation efficiency**	**Ref.**
	Light	**Ultrasonic**				
Sepiolite/TiO_2 composites	300 W Xe lamp (ORIEL,68811 ARC Lamp) with a 365 nm UV pass filter	-----	0.8 g/L	10 mg/L	The Orange-G removal efficiency can achieve 98.8% after 150 min of irradiation	1
WO_3–TiO_2 nanohybrid	150W tungsten halogen lamp ($\lambda \geq 400$ nm; intensity 80,600 ± 10 lx)	-----	1 g /L	3 x 10^{-5} M	94% Orange G dye was decolorized in 210 min at neutral pH with WO_3–TiO_2 nanohybrid	2
Titanium aminophosphates	-----	------	150 mg /100 mL	1x10^{-4} M	The degradation efficacy of OG was found to be maximum (97.1 %) at 0.001 M of H_2O_2 after a period of 250 min.	3
$FeVO_4$	500 W Xe arc lamp (OSRAM, Germany) and an UV cut filter as Visible source	-----	0.5 g/L	5 mg/L	The removal of OG dye in an aqueous solution with 15 mmol/L H_2O_2 at pH 7.0 reached 93.2% 60 min.	4
TiO_2	Xe-arc lamp (450 W, Oriel)	Sono waves: 213 kHz and 20 W.	1 g/L	9 x 10^{-5} M	Herein, US and UV are combined and significant enhancement in the degradation (85% in 75 min) of OG was observed	5
Fe^{3+}/ $Fe(OH)^{2+}$	Xe-arc lamp, $\lambda <$ 320nm	Sono waves: 213 kHz and 20 W.	0.05mM	9 x 10^{-5} M	Sonophotocatalytic process revealed 40 % of mineralization (TOC) in 240 min.	6
$CeNiO_3$	**UV source (352 nm: 6W)**	**US source: 38-160 kHz power of 50 Watt (Kaijo 30110, Japan)**	**0.2 g/L**	**2 x 10^{-5} M**	**Under optimum conditions, sonophotocatalytic efficacy shows 73.63 % in 240 min, 87 %, and 94.67 % in 180 min, under the UV and US irradiation of 38 kHz, 100 kHz, and 160 kHz, respectively.**	**Present work**

References:

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