

Supporting information

A comparative evaluation of physico-chemical properties and photocatalytic efficiencies of Cerium oxide and Copper oxide nanofluids

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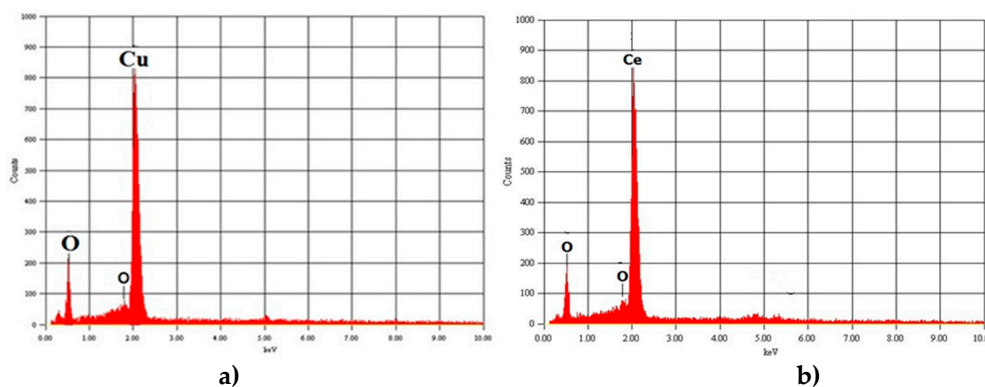
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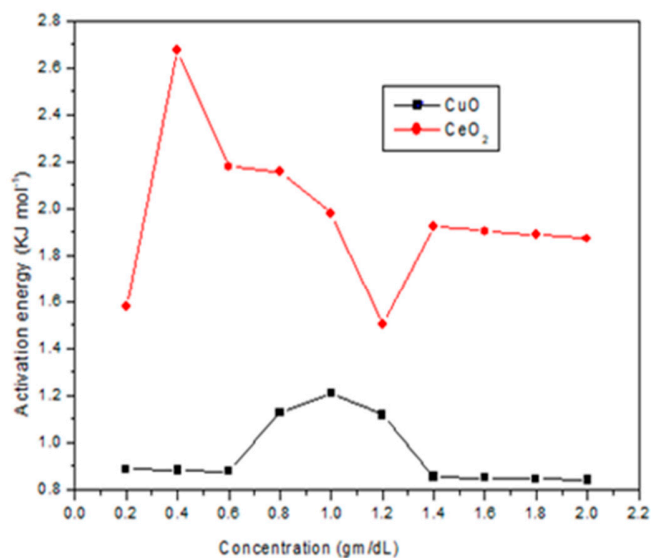
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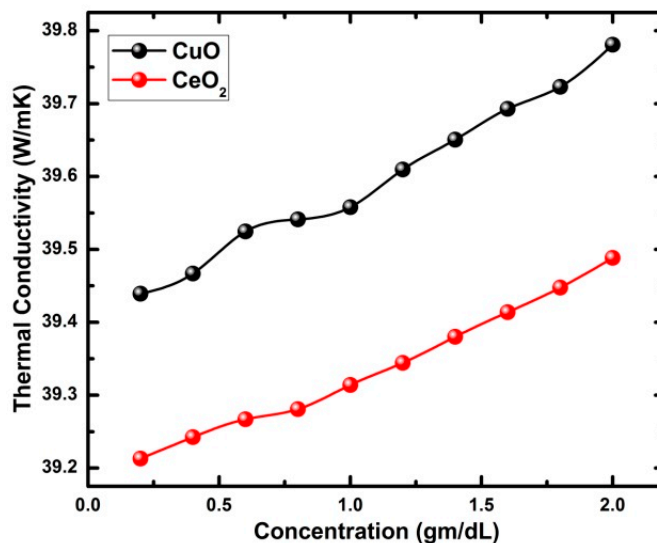


Supporting Information F1.EDS image of a) CuONPs and B) CeO₂ NPs.

Supporting information T1. Values of relative viscosity of CuO and CeO₂ NFs.

Concentration in (%)	Relative Viscosity (cP)							
	303K		308K		313K		318K	
	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂
0.2	1.82	1.03	1.81	1.02	1.80	1.01	1.79	1.00
0.4	1.83	1.04	1.82	1.03	1.81	1.01	1.8	0.99
0.6	1.84	1.05	1.83	1.04	1.82	1.02	1.81	1.01
0.8	1.86	1.06	1.85	1.05	1.84	1.03	1.82	1.02
1.0	1.87	1.07	1.86	1.06	1.84	1.05	1.83	1.03
1.2	1.88	1.08	1.87	1.07	1.86	1.06	1.84	1.05
1.4	1.89	1.1	1.88	1.09	1.87	1.08	1.86	1.06
1.6	1.9	1.11	1.89	1.1	1.88	1.09	1.87	1.07
1.8	1.91	1.12	1.90	1.11	1.89	1.10	1.88	1.08
2.0	1.92	1.13	1.91	1.12	1.9	1.11	1.89	1.09

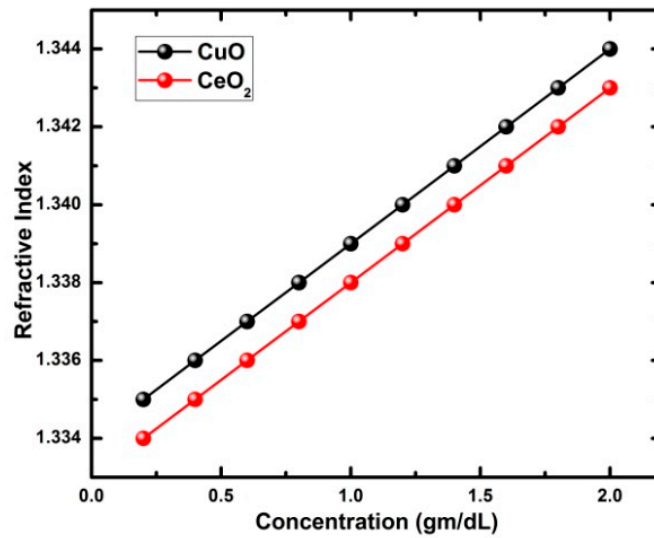
**Supporting Information F2.** Variation of activation energy with concentration



Supporting information F3.Variation of thermal conductivity with concentration.

Supporting information T2.Variation of Electrical conductivity parameters of CuO and CeO₂ with frequency.

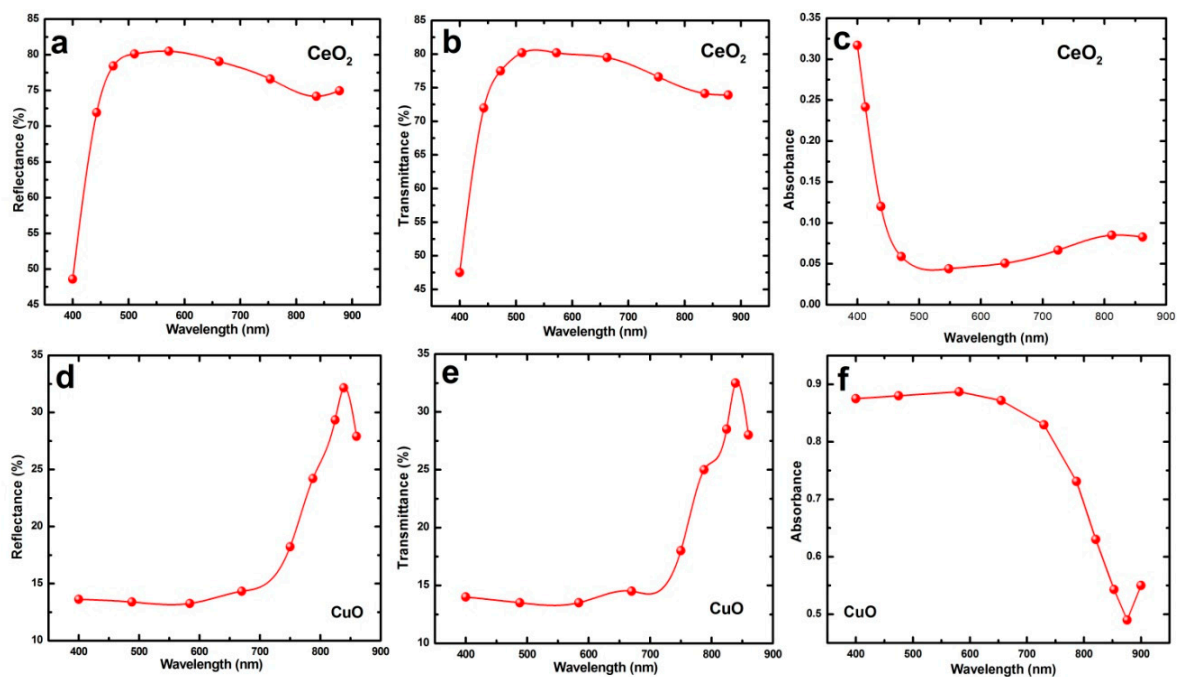
Frequency (Hz)	Impedance (Ω)		Angle (°)		Resistance (Ω)		Capacitance (F)		D-factor (D)		Reactance (Ω)	
	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂
	X10 ⁵	X10 ⁶	-	-	X10 ⁵	X10 ⁶	X10 ⁻¹²	X10 ⁻¹¹	-	-	X10 ³	X10 ³
100	5.46	11.6	5.33	8.73	5.57	14.68	293	1.92	9.3359	5.3950	-	-
992.54	4.46	7.85	13.78	38.52	4.59	12.97	88.5	1.24	3.8921	0.9549	-	-12948
5704.02	3.21	2.33	25.67	73.65	3.53	10.31	38.0	1.14	2.0794	0.2297	-765.8	-2456
9851.5	2.75	1.41	30.77	78.75	3.18	8.81	30.3	1.11	1.6651	0.1598	-552.6	-1451.4
10989.2	2.65	1.27	31.91	79.54	3.10	8.50	29.2	1.10	1.5901	0.1492	-515.9	-1306.5
1.08X10 ⁶	0.12	0.005	80.24	30.80	0.87	0.0068	11.3	0.91	0.1685	2.3487	-12.99	-16.1
2.09 X10 ⁶	0.078	0.0016	84.93	-1.99	0.76	0.0026	10.1	-0.85	0.0866	3.4271	-7.57	8.9
3.23 X10 ⁶	0.06	0.0009	89.89	-27.74	0.67	0.0017	8.5	-2.20	0.0003	1.3125	-5.82	2.2
4.48 X10 ⁶	0.058	0.0006	102.86	-46.24	-0.27	0.0013	5.9	-3.47	-0.1826	0.7860	-6.2	0.9
5.00 X10 ⁶	0.040	0.00067	116.41	-57.40	-0.14	0.0012	4.6	-4.03	-0.5008	0.6411	-6.9	0.7



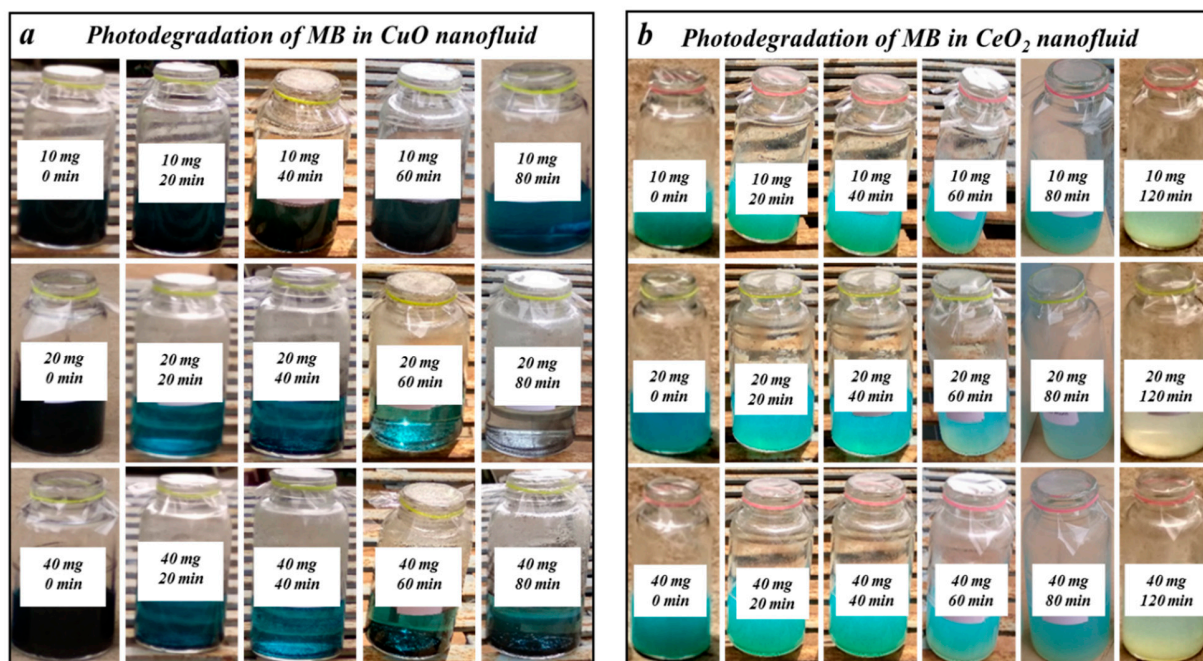
Supporting information F4. Variation of refractive index with concentration for CuO and CeO₂ NFs.

Supporting information T3.Electrical Conductivity and pH values of CuO and CeO₂ nanofluid with concentration.

CON	298K (mS)		303K (mS)		308K (mS)		313K (mS)		pH	
	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂	CuO	CeO ₂
0.2	4.89	3.95	4.48	3.6	3.94	3.37	3.58	3.09	8.86	6.78
0.4	4.95	4.03	4.54	3.92	4.02	3.65	3.62	3.28	8.96	6.93
0.6	5.23	4.12	4.67	4.02	4.13	3.86	3.67	3.45	9.01	7.02
0.8	5.84	4.27	5.37	4.14	4.91	3.94	4.16	3.59	9.09	7.17
1	6.14	4.38	5.81	4.21	5.06	4.09	4.32	3.88	9.15	7.26
1.2	6.28	4.47	5.96	4.34	5.29	4.17	4.64	4.06	9.29	7.38
1.4	6.68	4.56	6.12	4.49	5.73	4.24	5.16	4.11	9.35	7.52
1.6	7.09	4.67	6.68	4.58	6.09	4.39	5.48	4.27	9.46	7.74
1.8	7.55	4.84	7.08	4.72	6.59	4.56	5.92	4.38	9.55	7.85
2	7.85	5.02	7.12	4.94	6.87	4.78	6.19	4.57	9.6	7.96



Supporting information F5. Variation of reflectance, transmittance and absorbance of CuO and CeO₂ as a function of wavelength.



Supporting information F6. Snapshots taken during the photodegradation of MB with CuO and CeO₂ NFs over the irradiation time and concentrations of the NPs.