

Electronic Supplementary Information

NANOCRYSTALLINE CERIA: A NOVEL MATERIAL FOR ELECTRORHEOLOGICAL FLUIDS

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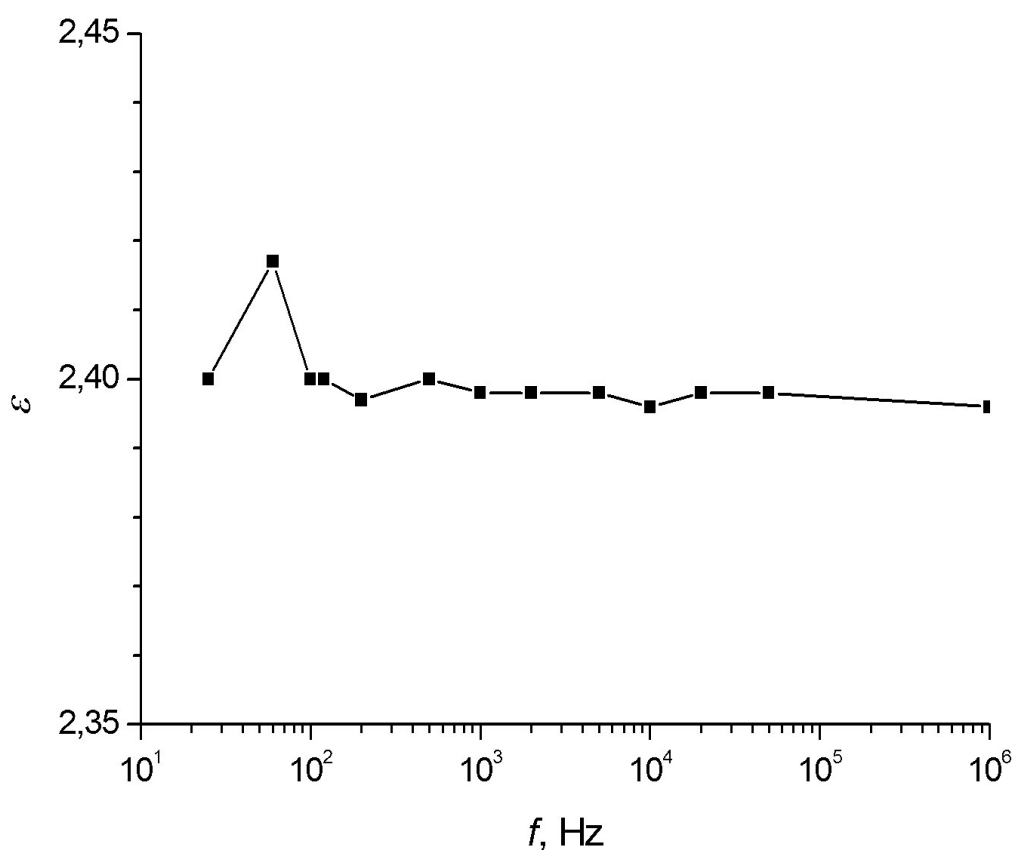


Fig. S1. Dielectric spectrum of PDMS.

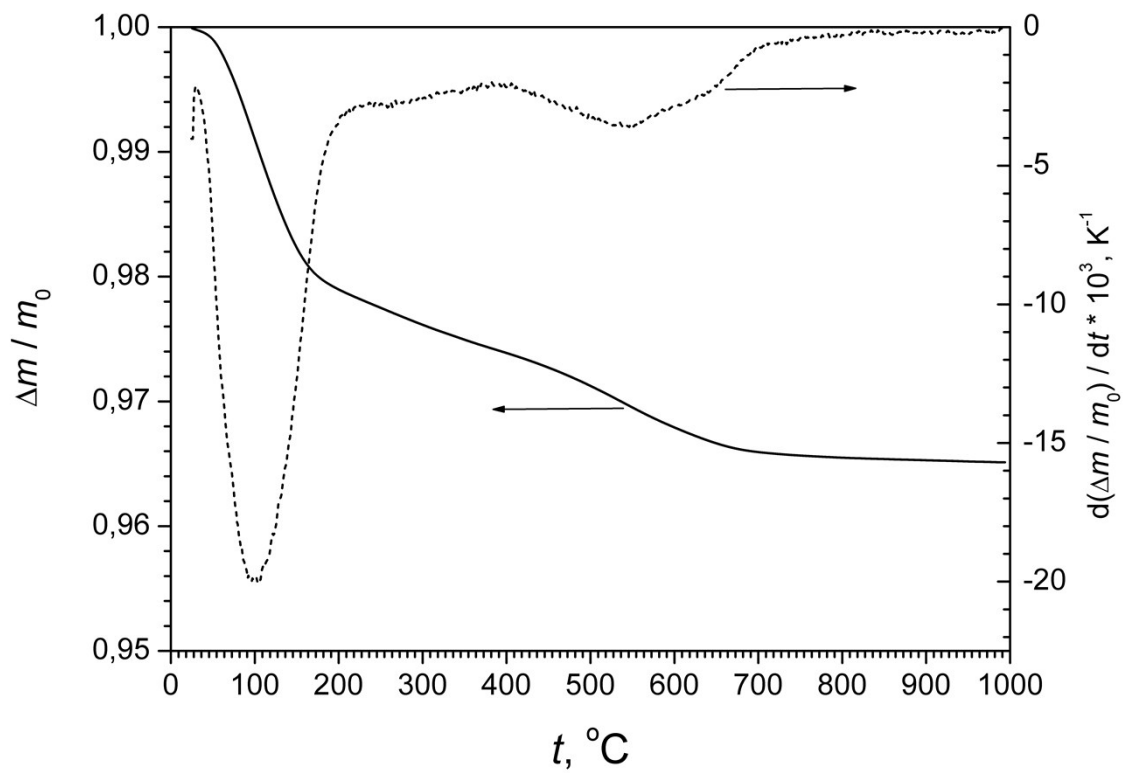


Fig. S2. Results of thermogravimetric analysis of the ceria sample.

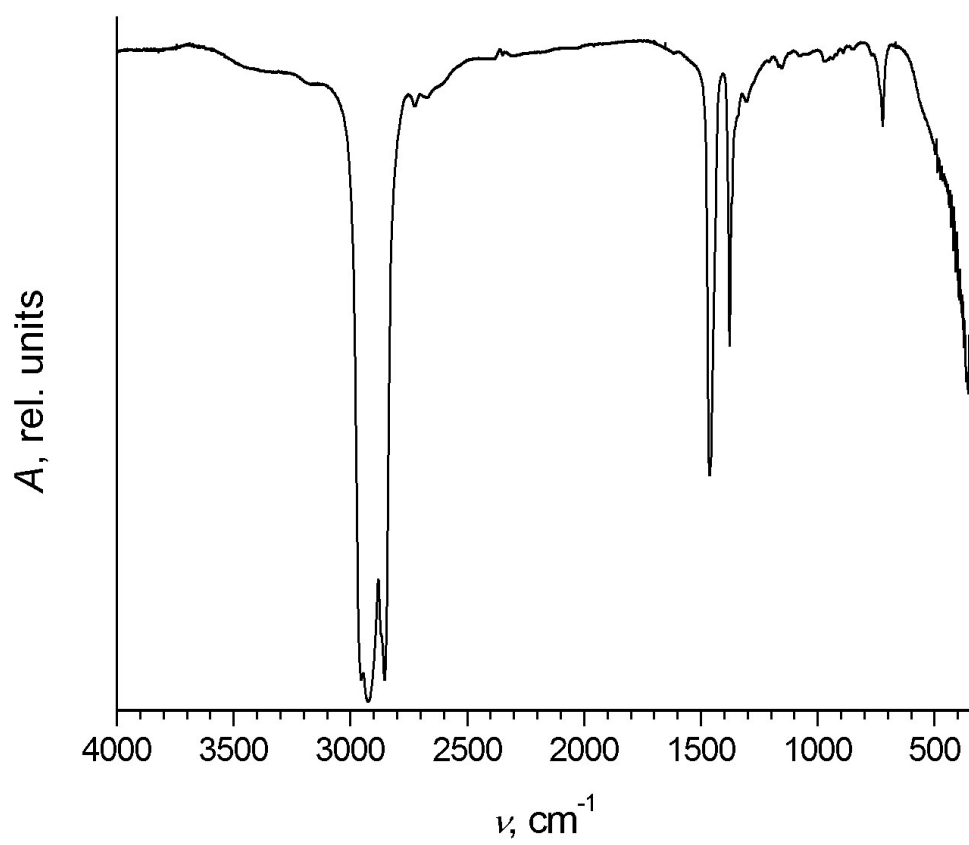


Fig S3. IR-spectrum of ceria sample.

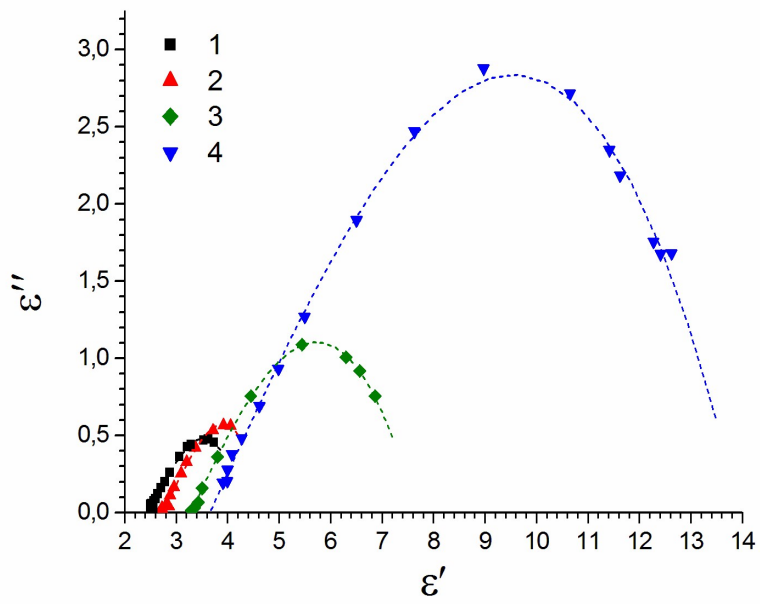


Fig. S4. Cole-Cole arcs for CeO₂ based ER fluids containing 30 wt.% (1), 40 wt.% (2), 50 wt.% (3) and 60 wt.% (4) CeO₂ in silicone oil.

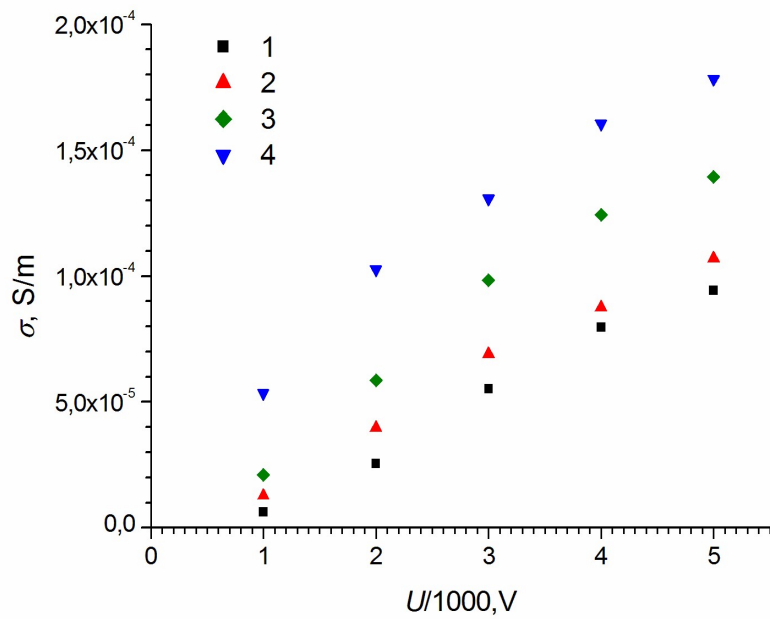


Fig. S5. Electric conductivity versus electrical field strength for electrorheological fluids containing 30 wt.% (1), 40 wt.% (2), 50 wt.% (3) and 60 wt.% (4) CeO₂. Electrode gap is 1 mm.

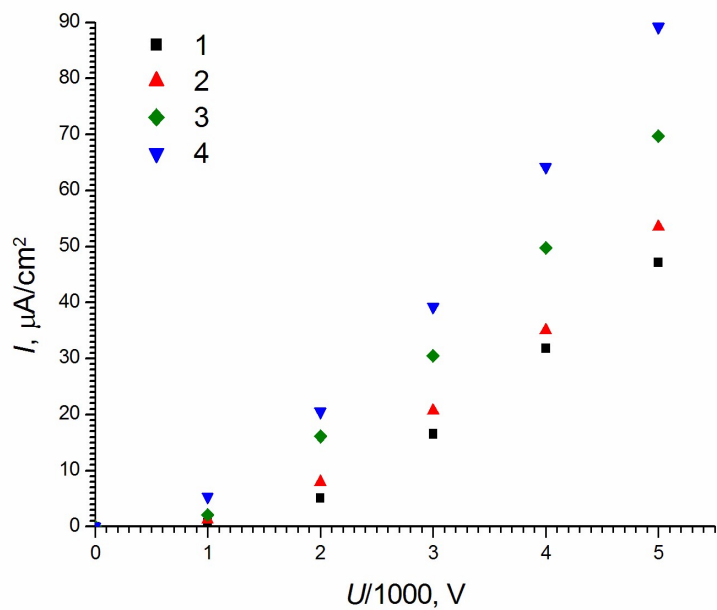


Fig. S6. Current density versus electrical field strength for electrorheological fluids containing 30 wt.% (1), 40 wt.% (2), 50 wt.% (3) and 60 wt.% (4) CeO_2 . Electrode gap is 1 mm.

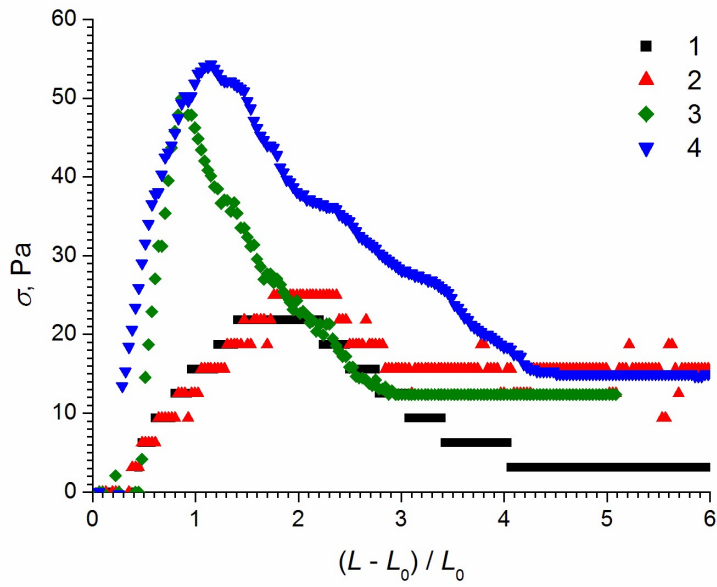


Fig. S7. Tensile stress (σ) versus relative deformation ($(L - L_0)/L_0$) plot for ceria/PDMS-based ER fluids with 30 (1), 40 (2), 50 (3) and 60 (4) wt.% of CeO_2 , in the absence of an electric field.

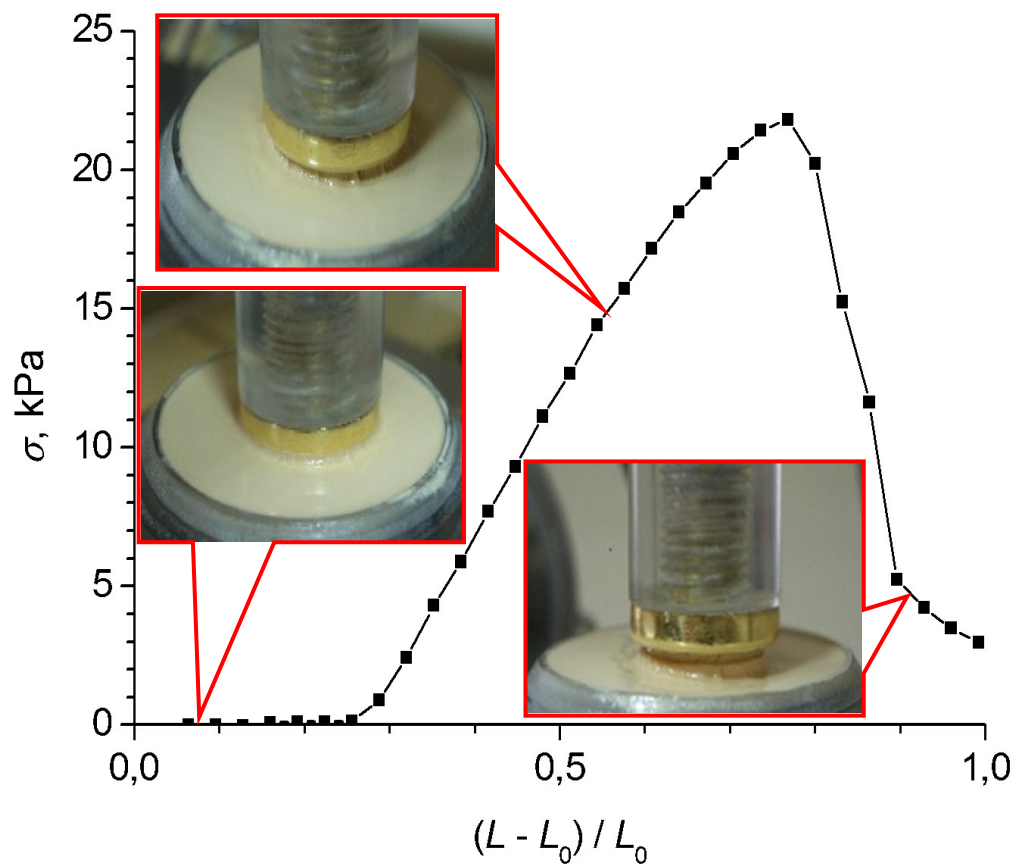


Fig. S8. The appearance of ceria-based ER-fluid comprising 60 wt.% CeO₂, in a 5 kV/mm static electric field.

Table S1. The influence of ceria concentration (vol.%) and electric field strength on the yield strength of the corresponding ER fluids.

E , kV/mm	Yield strength, kPa				Yield strength normalized to the yield strength at 1 kV/mm			
	5.3 vol.%	8.4 vol.%	12.1 vol.%	16.8 vol.%	5.3 vol.%	8.4 vol.%	12.1 vol.%	16.8 vol.%
1	0.4	0.7	3.0	4.0	1.0	1.0	1.0	1.0
2	1.0	1.5	7.0	11.1	2.5	2.1	2.3	2.8
3	2.0	2.6	11.1	17.9	5.0	3.7	3.7	4.5
4	3.0	4.4	13.9	19.9	7.5	6.2	4.6	5.0