Electronic Supplementary Information

Electrospun silica nanofiber mats functionalized with ceria nanoparticles for water decontamination

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Enclosed:

Fig. S.1-S.6

Table S.1

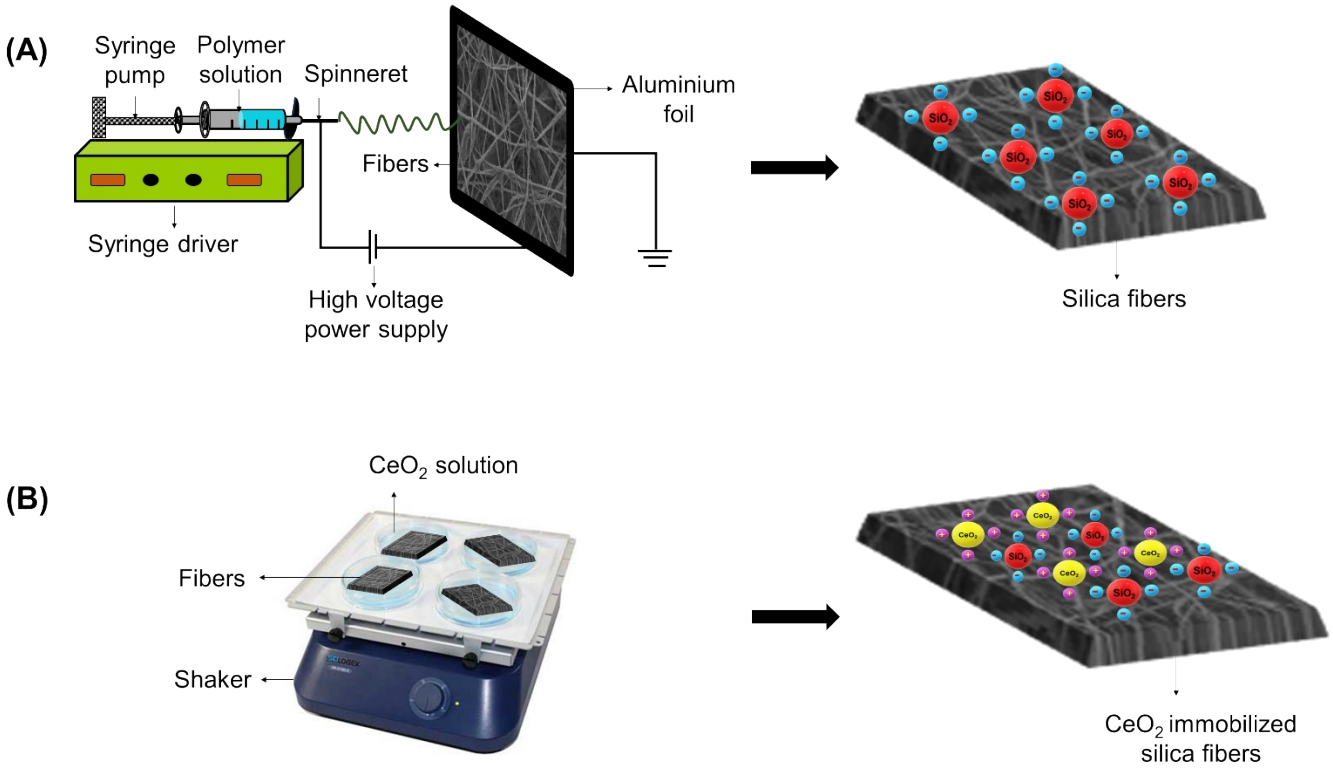


Fig. S.1. Schematic illustration of fabricating electrospun CeO_2 composite silica fibers. (A) Preparation of silica fibers by electrospinning. Experimental conditions: collector distance, 11 cm; rotating drum speed, 16 cm min^{-1}; collection time, 10 h; flow rate, 0.5 mL h^{-1}; applied voltage, 13 kV; temperature, 30°C; relative humidity, 30%. (B) CeO_2 immobilization on silica fibers. Experimental conditions: CeO_2 concentration, 1 mg mL^{-1}; fiber weight, 10 mg; shaker speed, 75 rpm; volume, 10 mL, immobilization time, 16 h; temperature, 25 °C.

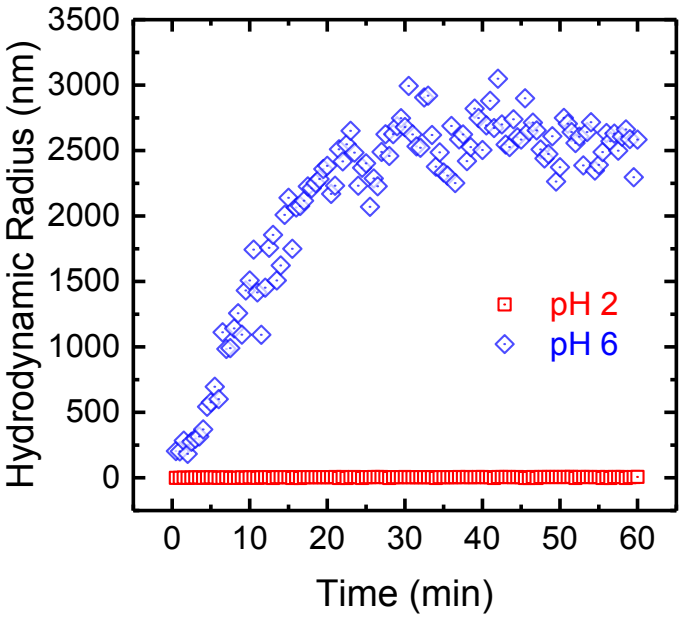


Fig. S.2. Aggregation kinetics for ceria nanoparticle suspension (in 10 mM acetate buffer solution) at pH 2 and 6 as determined by dynamic light scattering. Light scattering data are presented as the corresponding spherical hydrodynamic radius.

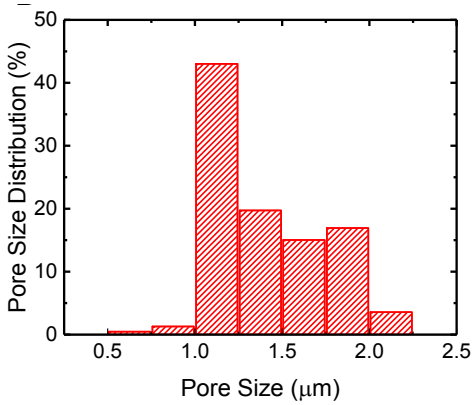


Fig. S.3. Pore size distribution of ceria/silica nanofiber composites.

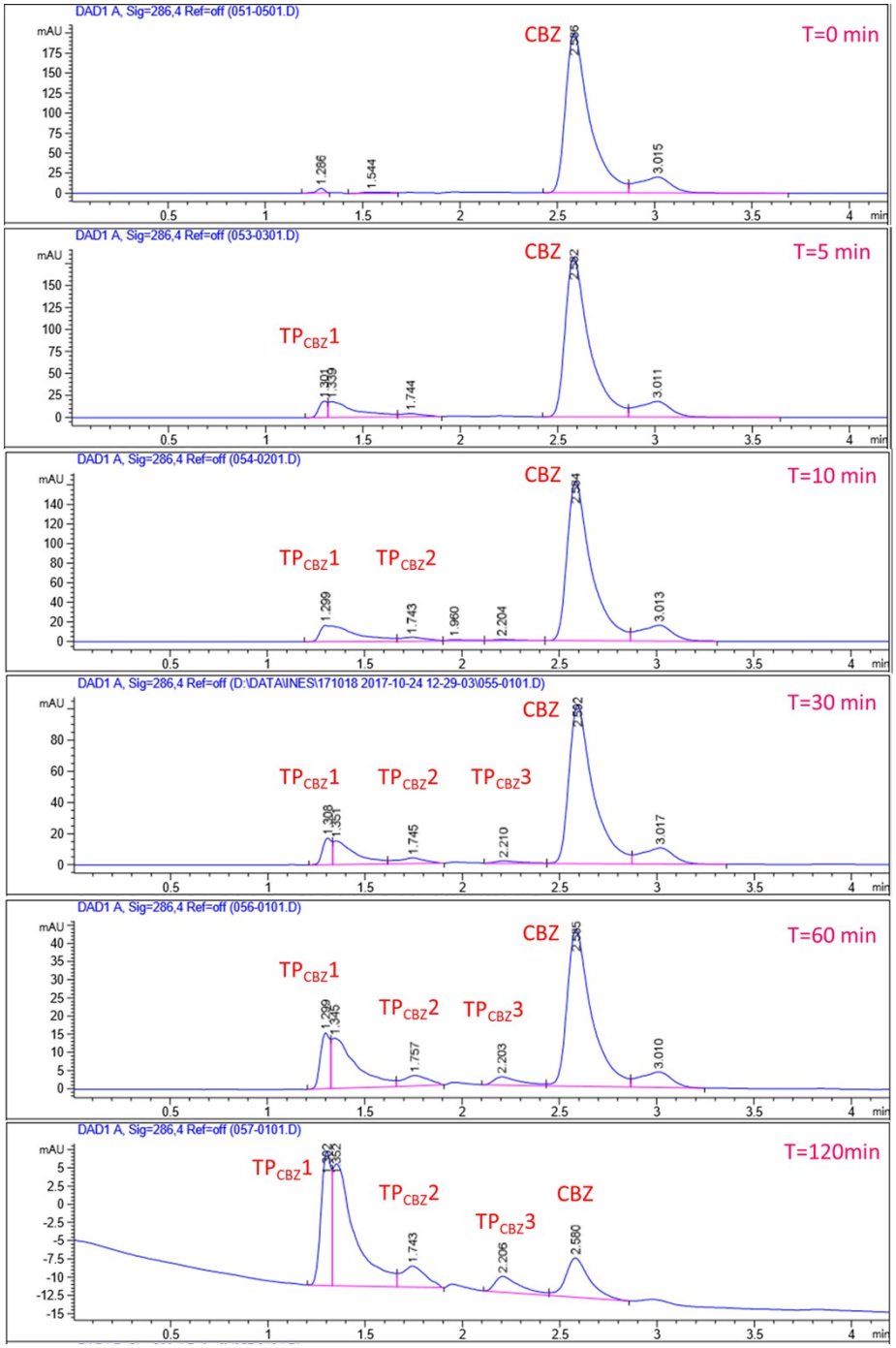


Fig. S.4. HPLC chromatographs taken during oxidation of 1 mg L^{-1} carbamazepine (CBZ) by ceria/silica fibers at pH 2 in the presence of 0.5 mM H_2O_2. Transformation products appeared during oxidation at lower retention times, and were marked as $TP_{CBZ}1$, 2 and 3.

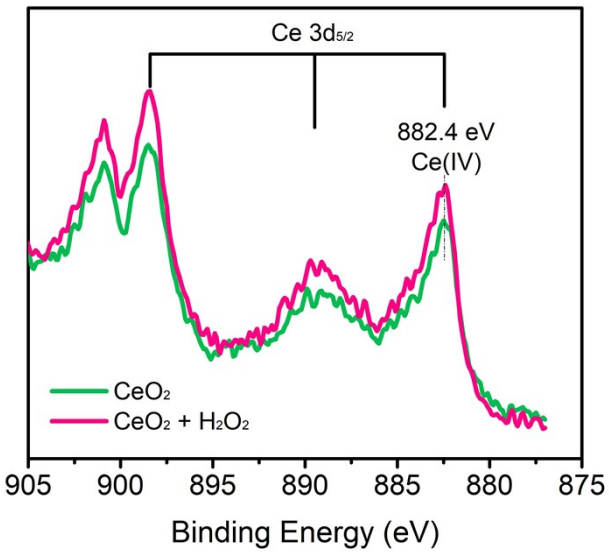
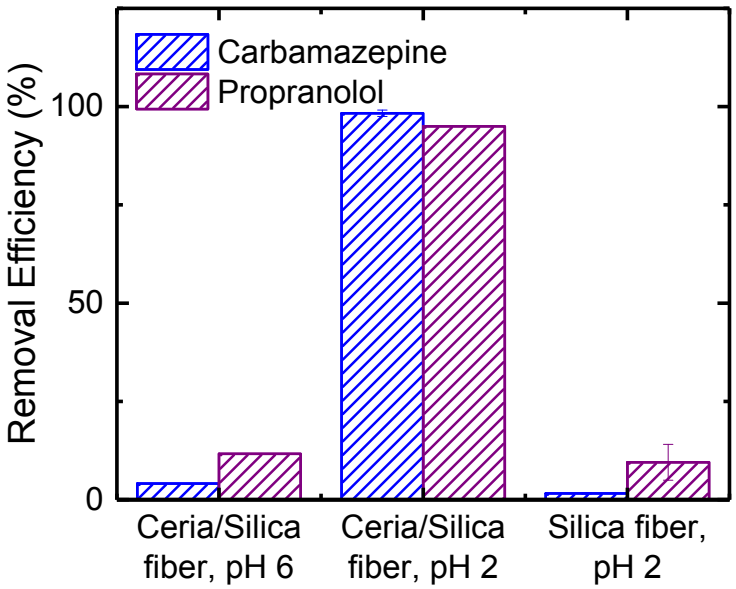


Fig. S.5. High resolution X-ray photoelectron spectroscopy (XPS) spectra of dried CeO_2 nanoparticles prior to and following addition of 0.5 mM H_2O_2. XPS data were obtained with a scanning XPS microprobe (PHI, VersaProbe II, Japan) using monochromatic Al K α radiation with a 0.47 eV system resolution.



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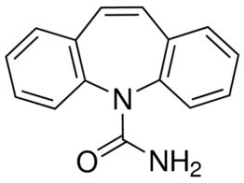
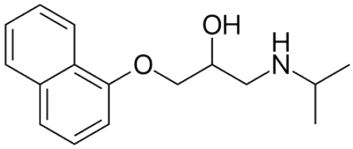
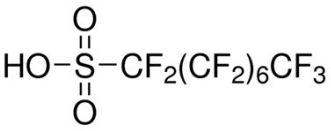
44 **Fig. S.6.** Removal efficiency of 1 mg L^{-1} carbamazepine (blue) and propranolol (purple) by

45 ceria/silica fibers and pristine fibers at pH 2 and 6 in the presence of 0.5 mM H_2O_2.

Table S.1. Chemical structures and properties of the trace organic compounds used in this study.

Property	Carbamazepine (CBZ)	Propranolol (PRO)	Perfluorooctanesulfonic acid (PFOS)
Chemical structure			
Molecular formula	$C_{15}H_{12}N_2O$	$C_{16}H_{21}NO_2$	$CF_3(CF_2)_7SO_3H$
Molecular weight (g mol^{-1})	236.27	295.80	500.13
pK_a	13.9	9.42	-3.27