Supplementary Information

A novel synthetic approach of cerium oxide nanoparticles with improved biomedical activity

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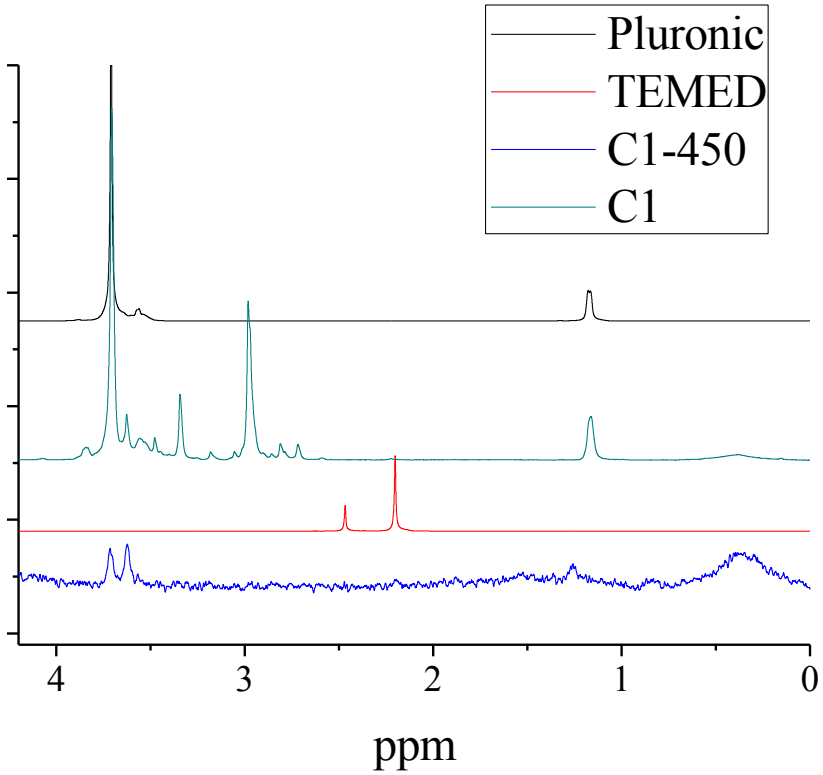

Figure S1. ^{1}H-NMR surface characterization of C1. *C1 ^{1}H-NMR spectrum compared with Pluronic F127, TEMED spectra and C1-450 NPs.*

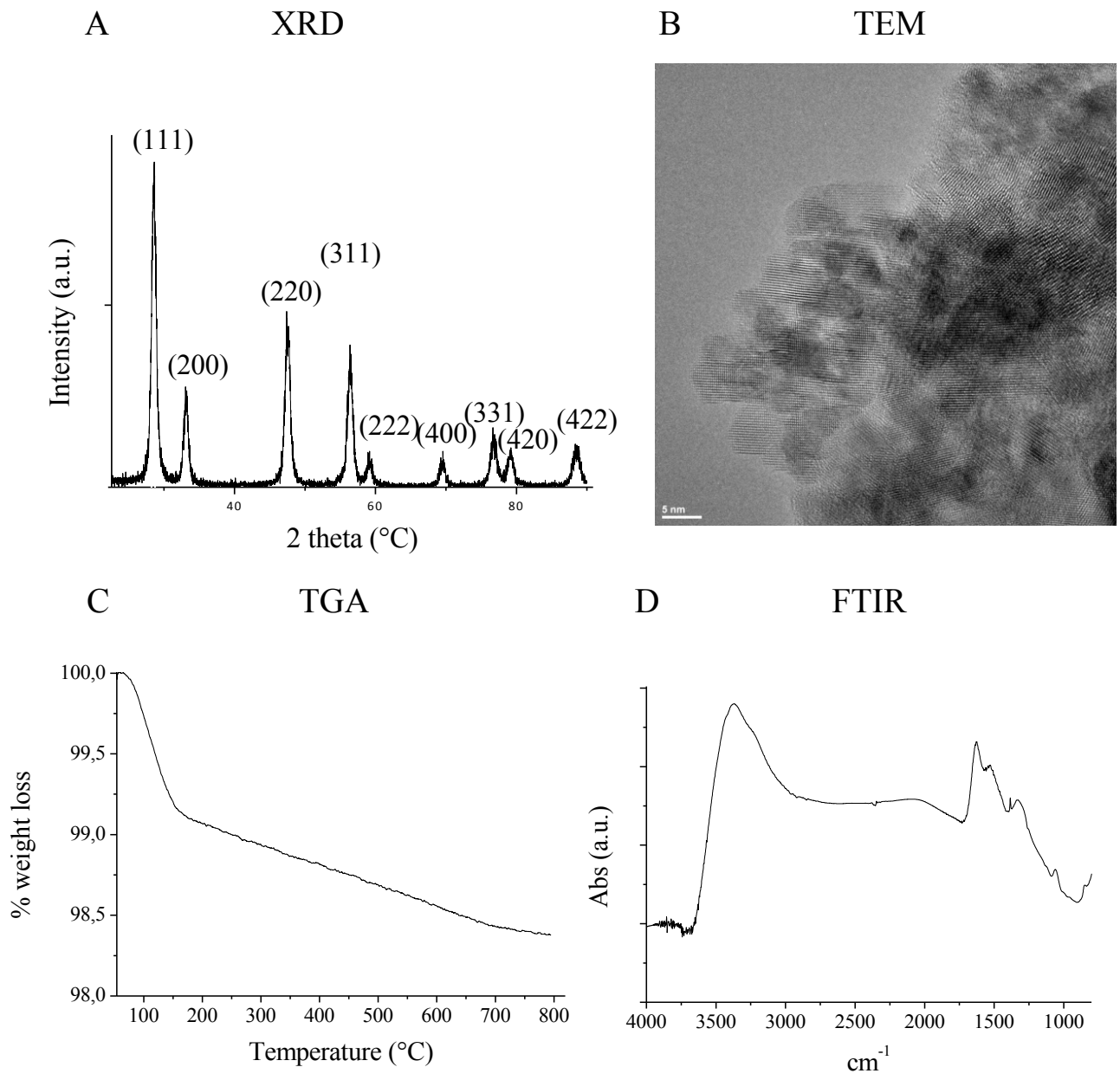

Figure S2. C1-450 Physico-chemical characterization. *(A) XRD diffraction patterns and Miller indexes. (B) TEM image. (C) TGA curve. (D) FTIR absorbance spectra.*

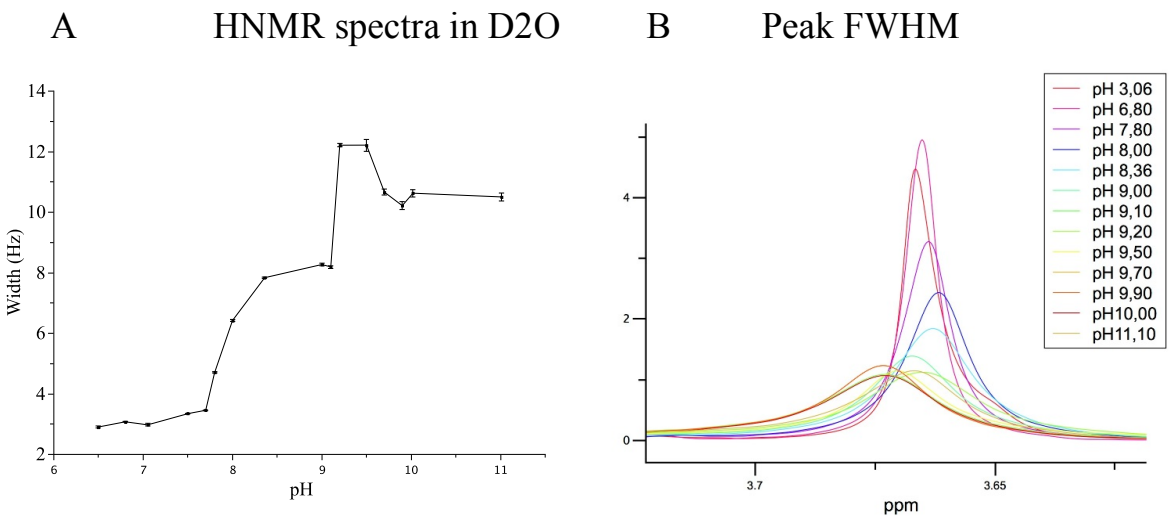

Figure S3. Ce (III)-EG coordination depends on pH. *(A) ^{1}H-NMR spectra of EG peak at 3.66 ppm varying the pH from 3 to 11. (B) Dependence of peak full width at half maximum (FWHM) on the pH.*

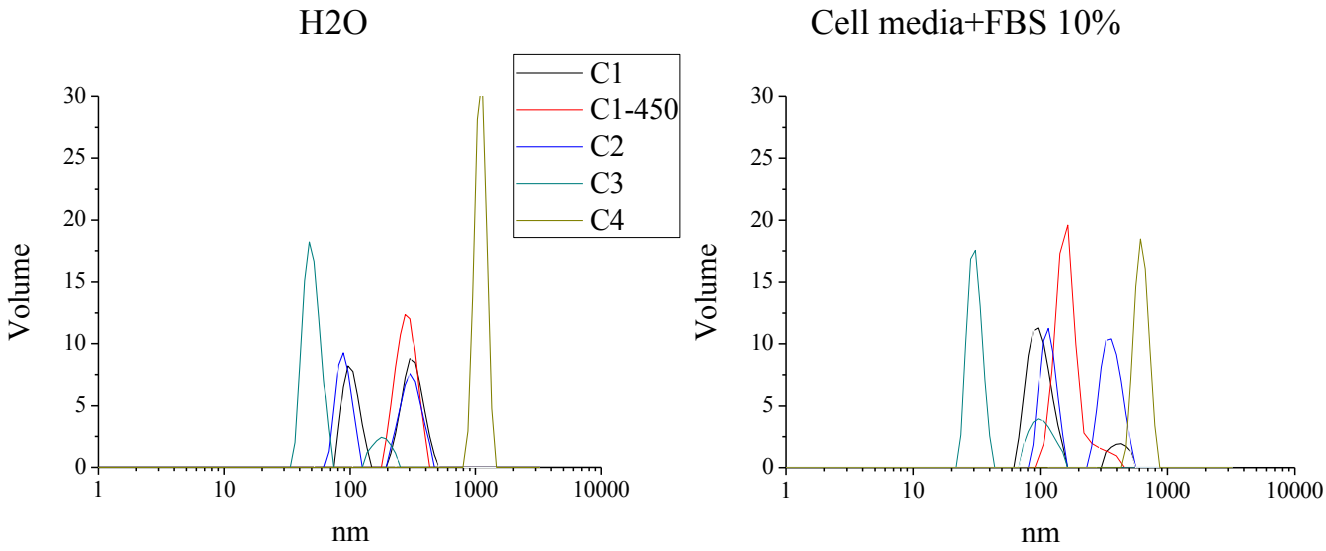

Figure S4. CNP dispersion properties. *DLS analysis of C1, C1-450, C2, C3, and C4 at 200 µg/mL in water (pH 7.4) and in RPMI media +10% fetal bovine serum (FBS). The hydrodynamic diameter distribution by volume is reported.*

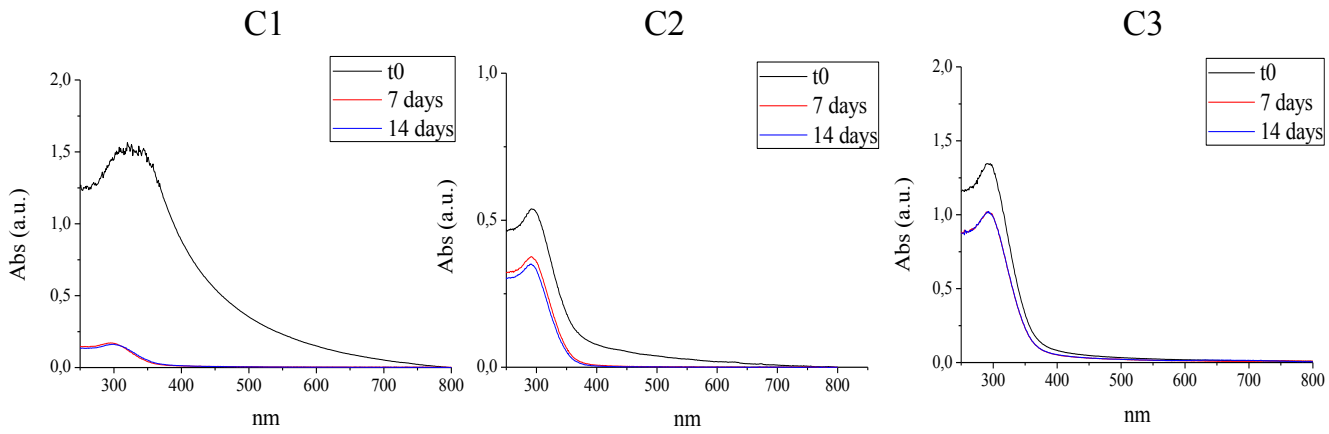

Figure S5. CNP precipitation analysis over time. *Time dependent variation of CNPs UV-VIS supernatant spectra after 7 days (red curve) and 14 days (blue curve) compared with CNP spectra immediately after sonication (black curve). CNP nominal concentration was set at 50 μg/mL.*

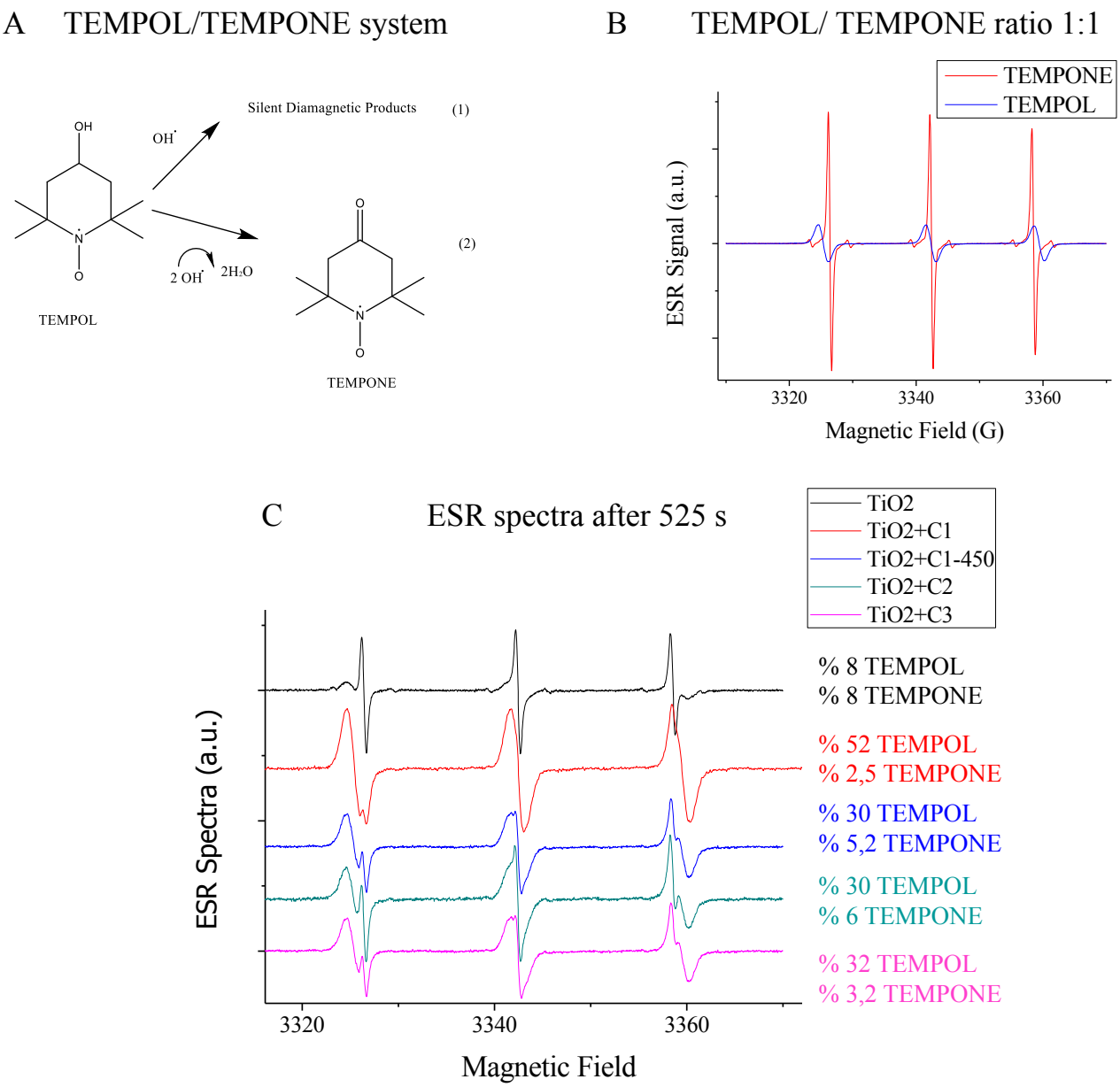

Figure S6. TEMPOL/TEMPONE ESR system. *(A) Scheme of TEMPOL degradation by HO• producing diamagnetic products (reaction 1), and paramagnetic TEMPONE species (reaction 2). (B) Simulation of TEMPOL (blue curve) and TEMPONE (red curve) ESR spectra (TEMPOL: TEMPONE ratio 1:1). TEMPOL spectra is shifted to the right by 0.035 G. (C) ESR spectra of 100 μM TEMPOL after 525 s of continuous production of HO• ± (C1, C1-450, C2 and C3 samples) as described in Methods section. For each spectra the quantification of TEMPOL and TEMPONE signals are reported in the bottom right.*

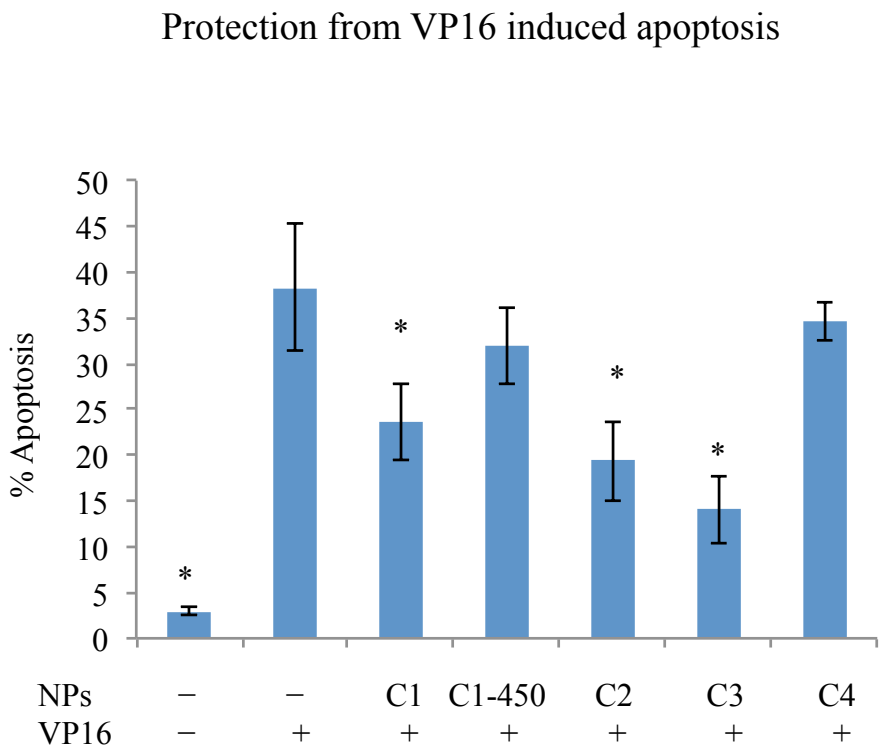

Figure S7. Redox active CNPs reduce redox dependent apoptosis*. % of apoptosis detected 3 h after cell treatment with VP16 ± CNPs. Values are the mean of ≥ 3 independent experiments ± SD; *p < 0.05 (ANOVA). Significance with respect to the control group is shown.*