

Supporting Information for

High Catalytic Efficiency from Er³⁺ doped CeO_{2-x} Nanoprobes for in vivo Acute-Oxidative Damage and Inflammation Therapy

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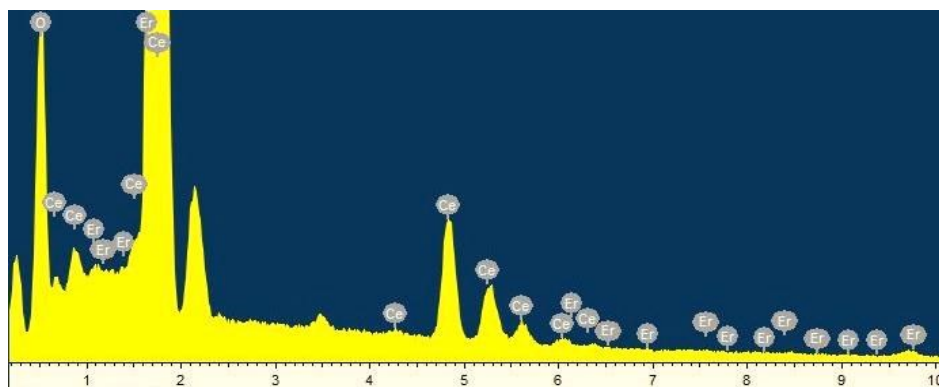


Figure S1. The EDS image of Er/Ce₂O₃ nanoparticles

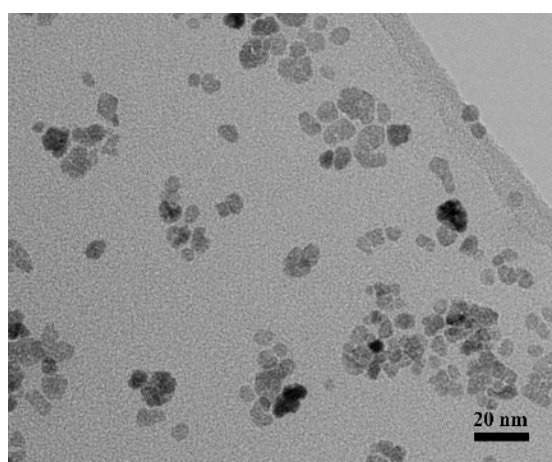


Figure S2. The TEM image of Er/Ce₂O₃ nanoparticles

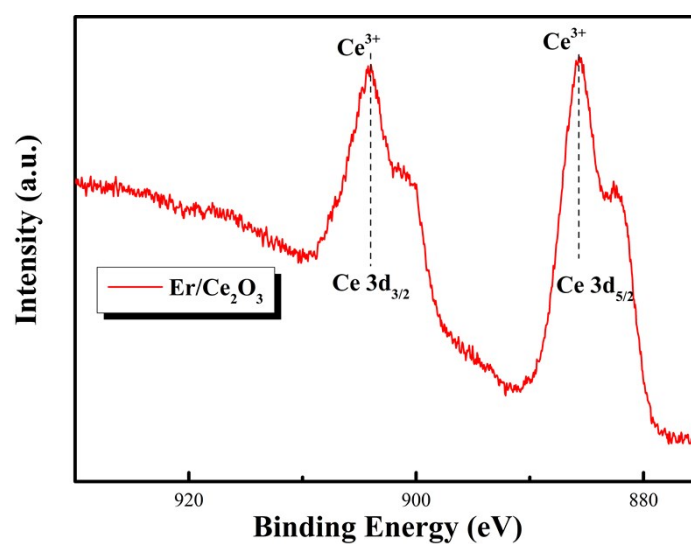


Figure S3. The XPS result for pure Ce₂O₃: Er NPs without hydrogen peroxide

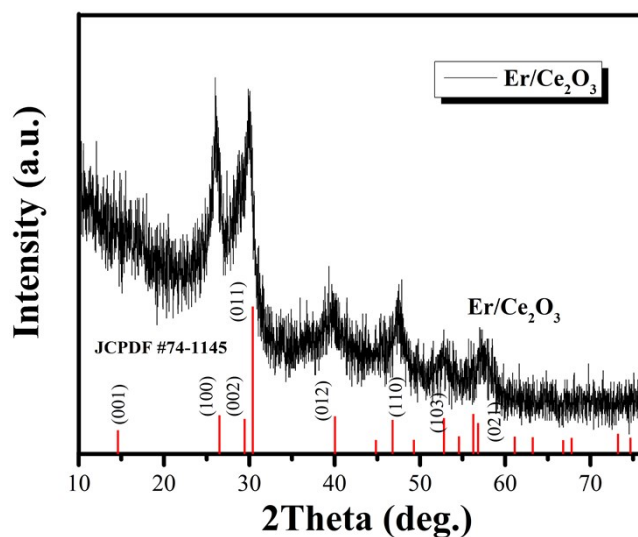


Figure S4. The x-ray diffraction of pure Er/Ce₂O₃ NPs

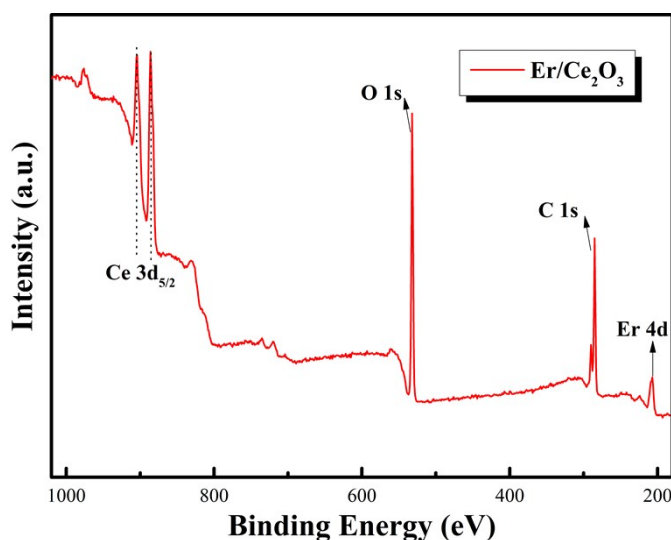


Figure S5. The XPS of Er/Ce₂O₃ without H₂O₂

The deconvolute the XPS data to find the concentration Ce³⁺ and Ce⁴⁺ oxidation state was measured in Figure S6. In order to validate the changes in the nanoceria surface valence chemistry, x-ray photoelectron spectroscopic (XPS) (PE-PHI5400) study was carried out on all the particles at optimized conditions. Figure 1 showed the deconvoluted XPS Ce (3d) spectrum for Er/Ce₂O₃ NPs. In the Figure 1, v_0 , v' , u_0 , and u' peaks were attributed to Ce³⁺, while u and u'' were the characteristic peaks of Ce⁴⁺ ions. The peak positions for all the samples were listed in Table S1.

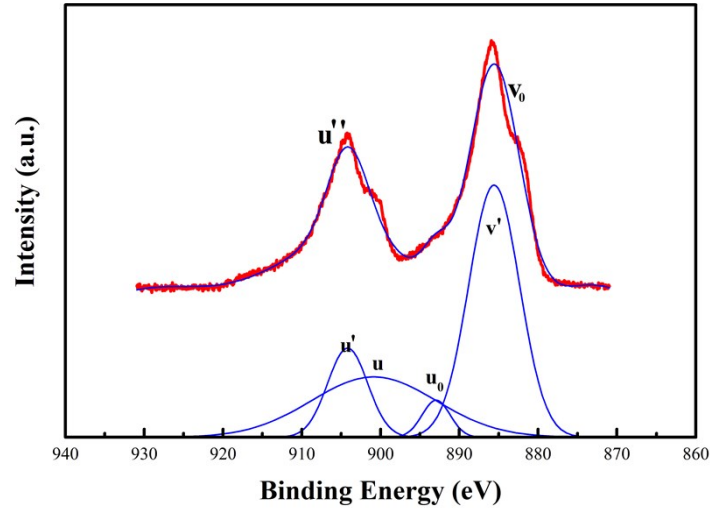


Figure S6. The deconvoluted XPS Ce (3d) spectrum for Er/Ce₂O₃ NPs.

Table S1. XPS binding energies of individual peaks of the Ce (3d) spectrum

	v_0	v'	u_0	u	u'	u''
Ce ($3d_{5/2}$)	885.58	920.54				
Ce ($3d_{3/2}$)			892.94	900.85	904.17	877.56

A semiquantitative analysis of the integrated peak area provided the concentration of Ce³⁺ ions in the synthesized nanoparticles. It can be calculated as equation S1. where A_i was the integrated area of peak “i.”

$$[Ce^{3+}] = \frac{A_{u_0} + A_u + A_{v_0} + A_v}{A_{u_0} + A_u + A_u' + A_{u''} + A_{v_0} + A_v} \quad (S1)$$

The Ce³⁺ concentration in Er/Ce₂O₃ with H₂O₂ for 24 h was found to be 67 atom%, while that Ce⁴⁺ concentration was 33 atom%.