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Van Vleck paramagnetism in undoped and Lu-doped bulk ceria

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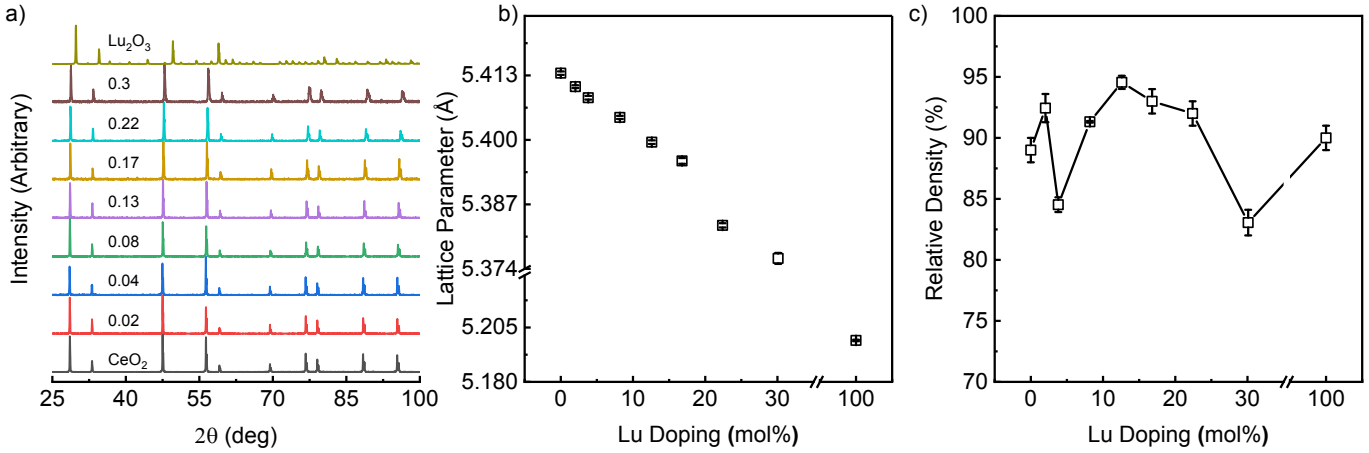

Figure S1. (a) XRD patterns of $Lu_xCe_{1-x}O_{2-x/2}$ in the fluorite phase x=0-0.35, and of Lu_2O_3 in the double fluorite phase (half-lattice parameter). (b) Fluorite lattice parameter as a function of Lu-content. Until x=0.30, the ceramics are single phase, but demonstrate lattice contraction. (c) Relative density of sintered samples, as measured by the Archimedes method.

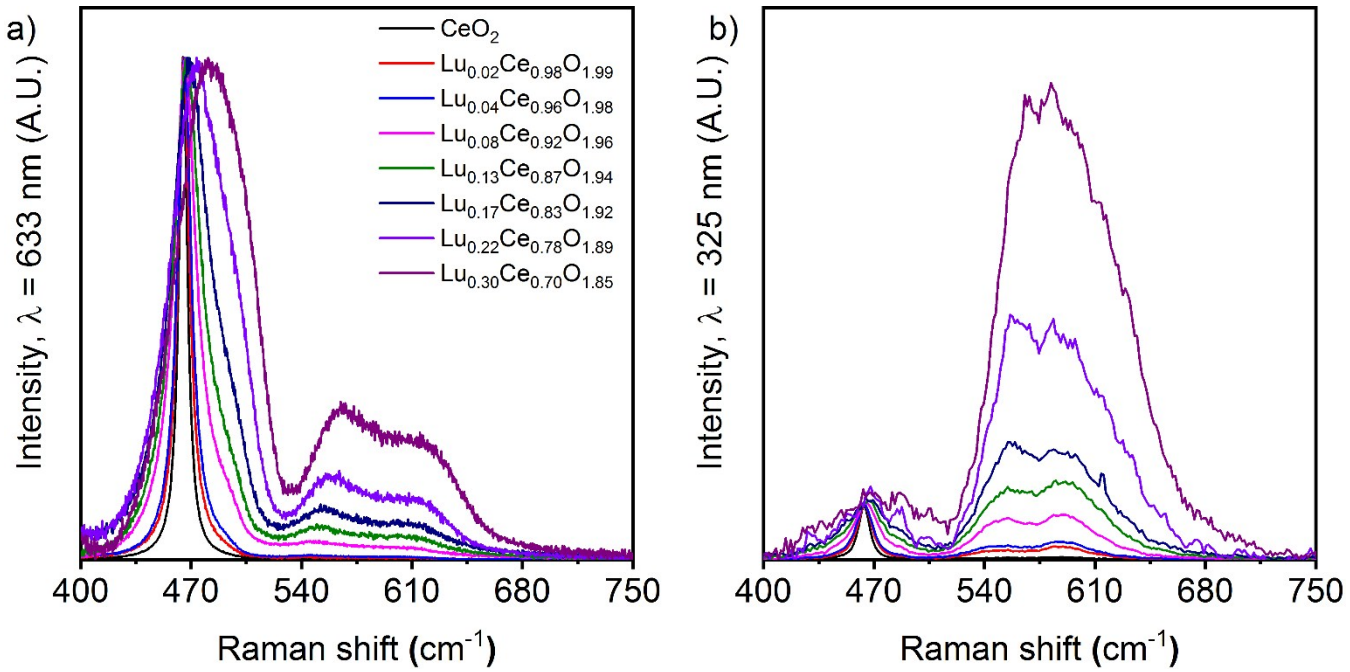

Figure S2. Normalized (to the amplitude of the F_{2g} mode) Raman spectra of lutetium doped ceria, *x*=0-0.30, using radiation sources with wavelength (a) 633nm (red) and (b) 325nm (near uv). The F_{2g} peak (for undoped CeO_2 at 467 cm^{-1}) displays a blue shift as well as an increase in peak width with increase in dopant concentration.

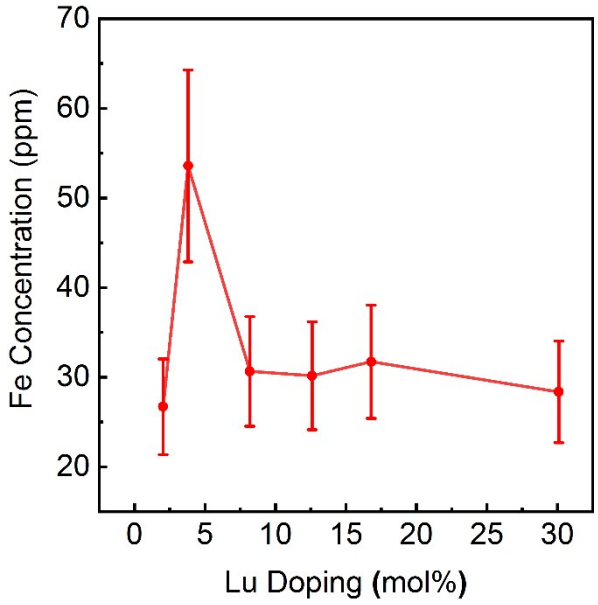

Figure S3. Concentration of Fe found by ICP-MS in the Lu doped ceria powders prepared as described in the Experimental section.