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Unexpected magnetization in highly pure metal oxide nanoparticles C.B. HANNA, GORDON ALANKO, BOONE BEAUSOLEIL, JORDAN CHESS, AARON THURBER, ALEX PUNNOOSE, Boise State University — We report the synthesis and characterization of a large set of highly pure metal oxide (CeO_2, SnO_2 and ZnO) nanoparticles of ultra-small size (2-10 nm). While the metal oxide systems in this study are non-magnetic as bulk materials, our prepared nanoparticles possess an unexpected small room-temperature ferromagnetic magnetization on the order of 0.001 emu/g. This magnetization is shown to not be a result of magnetic impurities, and is discussed in terms of modification of the electronic structure and crystal lattice. These nanoparticles were thoroughly characterized in their size and phase by x-ray diffraction, morphology by transmission electron microscopy, chemical state and elemental purity by x-ray photoelectron spectroscopy, electronic bandgap by UV-vis absorption spectroscopy, and magnetic properties by vibrating sample magnetometry and electron paramagnetic resonance.

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