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Magnetization Reversal in Europium Sulfide Nanocrystals JAMES DICKERSON, MARCELA REDIGOLO, Dept. of Physics and Astronomy, Vanderbilt University, DMITRY KOKTYSH, Dept. of Chemistry, Vanderbilt University, SANDRA ROSENTHAL, Dept. of Chemistry and Dept. of Physics and Astronomy, Vanderbilt University, ZHENG GAI, Center for Nanophase Materials Science & Materials Science and Technology Division,, Oak Ridge National Laboratory, LAN GAO, Center for Nanophase Materials Science Division, Oak Ridge National Laboratory, JIAN SHEN, Center for Nanophase Materials Science & Materials Science and Technology Division,, Oak Ridge National Laboratory — We report the observation of the reversal in the magnetization hysteresis curve of europium sulfide nanocrystals. This phenomenon was investigated through the temperature-dependent magnetization of two classes of nanomaterials, nanocrystalline (2.0 nm $\leq$ d_{NCs} $\leq$ 100 nm), and quantum-confined (d_{NCs} $\leq$ 2.0 nm), where d_{NCs} is the diameter of the nanomaterial. The effect of the size of the nanomaterial on the magnetization is attributed to the competition between the magnetic properties of strained surface atoms and unstrained core atoms. Superconducting quantum interference device (SQUID) probed the magnetic response. Electron microscopy and X-ray diffraction spectroscopy revealed the crystallinity and monodispersivity of the nanomaterials.

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