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Rotor-Rotor Interactions in a Three Dimensional Lattice of Dipolar Molecular Rotors R.D. HORANSKY, L.I. CLARKE[1], E.B. WINSTON, J.C. PRICE, University of Colorado, Boulder, J. NUNEZ, M.A. GARCIA-GARIBAY, University of California, Los Angeles — Crystals of dipolar molecular rotors may display novel phenomena with applications to memories and signal processing. We report on the characterization of crystals of synthesized dipolar molecular rotors. Crystal design provides for control over dipole moment, distance between dipoles, and barriers to rotation. We have previously reported characterization of the rotational potential for crystals with an asymmetric two-well potential in which the asymmetry was caused by steric interactions between the dipole and its surrounding crystal cage. In an effort to isolate the effects of rotor-rotor interactions, we now report on a system with a larger dipole moment and a sterically symmetric rotational potential. Dielectric spectroscopy results show that the two-well potential in this system is still asymmetric. Two models for the asymmetry are investigated through Monte Carlo simulations. In the first, we suppose that the asymmetry is caused by dipole-dipole interactions between rotors and evaluate the interaction strength needed to reproduce the observations. In the second, we consider the effects of a quenched random field.

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