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Order and disorder in the local and long-range structure of the spin-glass pyrochlore, $\text{Tb}_2\text{Mo}_2\text{O}_7$ YU JIANG, Lawrence Berkeley National Laboratory, ASHFIA HUQ, Oak Ridge National Laboratory, CORWIN H. BOOTH, Lawrence Berkeley National Laboratory, GEORG EHLERS, Oak Ridge National Laboratory, JOHN E. GREEDAN, McMaster University, JASON S. GARDNER, Indiana University and National Institute of Standards and Technology — The structure of $\text{Tb}_2\text{Mo}_2\text{O}_7$ is investigated using two techniques: the long-range lattice structure was measured using neutron powder diffraction, and local structure information was obtained from extended x-ray absorption fine structure measurements. While the long-range structure appears generally well ordered, enhanced mean-squared site displacements on the O(1) site and the lack of temperature dependence of the strongly anisotropic displacement parameters for both the Mo and O(1) sites indicates some disorder exists. Likewise, the local structure measurements indicate some Mo-Mo and Tb-O(1) nearest-neighbor disorder exists, similar to that found in the related spin-glass pyrochlore, $\text{Y}_2\text{Mo}_2\text{O}_7$. Although the freezing temperature in $\text{Tb}_2\text{Mo}_2\text{O}_7$, 25 K, is slightly higher than in $\text{Y}_2\text{Mo}_2\text{O}_7$, 22 K, the degree of local pair distance disorder is actually less in $\text{Tb}_2\text{Mo}_2\text{O}_7$. This apparent contradiction is considered in light of the interactions involved in the freezing process.

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