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Low temperature C/T^3 peak in dipole disordered $Bi_2Ti_2O_7$ GAVIN LAWES, RON TACKETT, AMBESH DIXIT, Wayne State University, ART RAMIREZ, LGS Innovations, JIM O'BRIAN, Quantum Design, BRENT MELOT, RAM SESHADRI, UC Santa Barbara — The presence of a low temperature peak in C/T^3 vs T, indicating excess entropy above the Debye contribution, is practically ubiquitous among both crystalline and amorphous materials. We present specific heat measurements on crystalline $Bi_2Ti_2O_7$, which is known to have incoherent ionic displacements leading to dipole disorder, and other related crystalline materials, including Bi_2NbInO_7, $Bi_4Ti_3O_{12}$, $Y_2Ti_2O_7$, and $PbTiO_3$, all of which exhibit excess low temperature entropy. We find that the C/T^3 peak for these samples agree roughly with a proposed scaling relation, with the peak temperature for $Bi_2Ti_2O_7$ being among the lowest reported for any crystalline material. We discuss our results in the context of understanding the evolution of crystalline degrees of freedom to glassy degrees of freedom through our investigations of dipole disordered $Bi_2Ti_2O_7$.

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