

On the low vibrational states seen in the heat capacity of incommensurate $ThBr_4$

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We report on the thermodynamic investigation of the low vibrational states of the truly incommensurate (IC) 3D compound $ThBr_4$, unique among other dielectrics for the lack of lock-in transition. Heat capacity measured in the T-range from 140 mK to 25 K demonstrates the glasslike anomalous behavior with the power-law contribution below 1 K and the C_p/T^3 bump above. We find both features being consequences of the phasons and the amplitudon, the typical IC-excitations in agreement with existing neutron investigation of these excitations. Ultimately, our analysis shows that there must be a low-energy gap in phason dispersion of about 10 GHz, what is considerably lower than the experimental uncertainty of the neutron data.