

LOW-TEMPERATURE CALORIMETRY ON POLYMORPHIC ETHANOL

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It is known [1] that ethanol exhibits a very interesting polymorphism presenting different solid phases: a fully-ordered or stable (monoclinic) crystal, a (bcc) plastic crystal which by quenching becomes an orientationally-disordered crystal with glassy properties, and the ordinary amorphous glass. Therefore, it appeared as a good model system to investigate low-temperature properties of glasses [2,3], including the role played by orientational vs translational disorder.

In the present work, we have extended previous work by implementing higher-accuracy calorimetric methods at low temperatures (both quasi-adiabatic and thermal relaxation ones). We have employed these new measuring methods to study the possible effect of water impurities on the calorimetric and thermodynamic behaviour of the different solid phases of ethanol.

[1] M. A. Ramos et al., J. Phys.: Condens. Matter 15 (2003) S1007-S1018, and references therein.

[2] C. Talón et al., Phys. Rev. B 58 (1998) 745

[3] C. Talón, M. A. Ramos and S. Vieira, Phys. Rev. B 66 (2002) 012201