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Stable, metastable and unstable phases of halogen methane derivatives

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Many molecular materials composed of globular or pseudo-globular molecules are capable of forming high-temperature orientationally disordered (OD) phases in which long-range positional order exists and orientational order has been lost. Halogen methane derivatives, as tetrahalogenomethane compounds (CX_nY_m, where n and m = 0, ..., 4; n + m = 4, and X,Y=F, Cl, Br and I) have been investigated by the Group of Characterization of Materials at the Universitat Politècnica de Catalunya during the last years [1]. In spite of the similarity of the molecules, fine tuning interactions give rise to a polymorphic behavior at normal pressure, i.e. in equilibrium with its vapor, quite different. The rational of the thermodynamics can be achieved when the polymorphism is analyzed in the whole temperature-pressure space. The presentation will describe the stable and metastable phases of those compounds revealed by the uncommon inclusion of the pressure variable as well as by the analyses of the two-component systems sharing them. Moreover, the emergence of unstable phases (glasses) [2] within the low-temperature domain will be analyzed and the similarities with the canonical glass-formers will be discussed.

References

1. M. Barrio et al. J. Phys. Chem. B **115** 1679 (2011); Chem. Phys. **358** 156 (2009); New J. Chem. **32**(2) 232 (2008); J. Phys. Chem. B **111** 8899 (2007); J. Phys. Chem. B **108**, 11089 (2004); Sz. Pothoczki et al. Phys. Rev. B **85** 014202 (2012) ; Ph. Negrier et al., Cryst. Growth and Design **10** 2793 (2010); Chem. Phys. **336** 150 (2007): R. Levit et al. J. Phys. Chem. B, **112** 13916 (2008); J.Ll. Tamarit et al. J. Phys. Cond. Matter **20** 244110 (2008); B. Parat et al., Chem. Mater. **17** 3359 (2005); L.C. Pardo et al. Chem. Phys. Lett. **402** 408 (2005); Phys. Rev. B **72** 014206 (2005); N. Veglio et al. Phys. Rev. E **72** 031502 (2005)
2. M.J. Zuriaga et al. J. Chem. Phys. **137** 054506 (2012); Phys. Rev. Lett. **103** 075701 (2009)