



**Abstract**

**Phase transitions in crystals**

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Phase transitions occurring in solids, and especially in the crystalline state, are matter of debate especially because observations made using different techniques and scientific background of experimentalists and theoreticians produced a variety of keywords and a very complex language, that is far from being universal.

Recently, a review article by F. Herbstein [1] has tentatively addressed this problem, especially concerning the mechanism of phase transitions in crystals. However, the problem remains because a unified theory is in fact missing.

This lecture will briefly summarize the most common theories on phase transitions in crystalline solids, focusing on different classes of materials (for example minerals and inorganic solids, organic or organometallic molecular crystals, etc.). A thermodynamic background will be given for phase transitions produced by temperature and/or by pressure will be discussed. The most common crystallographic techniques (X-ray or neutron diffraction, microscopy, calorimetry) will be presented [2].

[1] Herbstein, F. K. *Acta Cryst.*, **B62**, 341-383 (2006).

[2] Macchi, P., *Topics in current Chemistry*, in the press (2011).