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Amorphous pharmaceutical material, characterization and manipulation

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Solid compound can either be obtained as crystals or amorphous glasses. Control and manipulation of these two forms of the molecular solid state is the key to optimisation of pharmaceutical formulations with regard to two antagonistic features i.e. stability and solubility. Challenging problems concern the prediction and control of the interconversions between these two forms as well as the characterization of the glassy state which is not in thermodynamic equilibrium. In this communication we will examine several modes of interconversion between crystalline and glassy states of the same compound which result from stresses created by processing methods. We will particularly emphasise the direct solid state amorphization and the opposite crystallization in the glassy state. The effects of grinding and dehydration will be more specifically addressed. It will be shown that rationalization and possibilities of prediction are emerging. We further discuss specific processing effects on the physical state of the glass itself. This approach is used to address issues of poly-A-morphism. Finally some recent advances in the possibility to manipulate the stability of amorphous solids will be presented. Time permitting the occurrence of glass transition in disordered pharmaceutical crystals will be demonstrated.

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