

# **SOLID-STATE TRANSITIONS OF PHARMACEUTICAL COMPOUNDS STUDIED BY POWDER X-RAY DIFFRACTION**

*E. Theunissen, J. Dickens, D. Cleeren, S. Stokbroekx, J. Peeters and M. Brewster*

Solid pharmaceutical compounds exist as crystalline polymorphs and solvates or in amorphous forms, which can result in a large number of solid-state transitions upon heating, during processing or during storage. The most important solid-state transitions are dehydration/desolvation, hydration, polymorphic conversions, melting, decomposition, and crystallization. Developing a physically and chemically stable product/formulation is therefore a difficult and time-consuming process and needs in detail mapping and understanding of the different solid-state transitions of the to-develop compound. A variety of physical techniques are useful to investigate solid-state transitions. The most used techniques are powder X-ray diffraction, infra red and raman spectroscopy, dynamic vapour sorption and thermal analysis. Here, we focus on powder X-ray diffraction to get a better understanding of the solid-state transitions observed during production and storage of pharmaceutical compounds.