

ANALYSIS OF AMORPHOUS PHASE IN HIGHLY CRYSTALLINE API BY POWDER X-RAY DIFFRACTION AND DSC

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Most pharmaceutical programs require the stability afforded by the development of highly crystalline APIs. The introduction of an amorphous phase by the API manufacturing process can occur by several mechanisms, including fast crystallization rates, fast drying rates, and shear. The presence of the amorphous phase can lead to several material concerns, including aggregation, chemical instability, and differences in the material processibility, either from mechanical or surface property changes. Additionally, the amorphous phase is a less stable solid phase, often resulting in crystallization during the shelf life of a product, which could result in dissolution changes.

Initial phase evaluation in API and product is often performed by PXRD and DSC. In ideal cases, the PXRD and DSC results coincide, while the presence of thermal instability and crystal defects can cause the two techniques to provide disparate results. The effects of these challenges to phase characterization and analysis by PXRD and DSC for a desolvated API will be presented.