

## **Examples of PDF-4/Organics 2010 Polymorphs**

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The impact of polymorphs in the pharmaceutical sciences cannot be over emphasized. It affects the solubility and effectiveness of pharmaceutical substances. The chemical and physical properties of polymorphic compounds, such as hydrogen bonding and melting point, are complex. The solid state formation of polymorphs is both an art and a science. Specific solvent polarity, temperature, pressure, crystallization rate, and other chemical and physical conditions are required to produce a desired polymorph. It is the delicate balance between the opposing kinetic and thermodynamic forces which dictates the successful formation of a pure polymorph. Exhaustive experiments are often conducted to ensure the polymorphic purity for a compound with many polymorphs.

The large number of polymorphs in the PDF-4/Organics 2010 provides an excellent reference source for polymorphic identification. It also provides good data mining opportunities for pharmaceutical polymorphs. These polymorphs include the regular packing polymorphs, conformational polymorphs, and hydrates. X-ray powder diffraction (PXRD), unlike infrared spectroscopy (IR) and differential scan calorimetry (DSC), provides in depth crystal structure information. Therefore, PXRD is a comprehensive method for polymorphic identification. The quality of the PXRD pattern can be greatly affected by the nature of the compound, various instrument limitations, and the different specimen preparation methods. A good quality pattern provides accurate identification and characterization. A poor quality pattern could mislead the analyst for false polymorphs. Here, not only common pharmaceutical polymorphs from the PDF-4/Organics 2010 will be introduced, but also some specific polymorphic compounds, including an active pharmaceutical ingredient, a peptide, and an excipient will be discussed in detail.