Crystal Engineering: Importance of Surface Properties

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Abstract

The talk will review conventional wetting techniques for determination of surface energy. A novel experimental approach, sessile drop contact angle measurements on the individual facets of macroscopic (>1cm) single crystals will be discussed. We present results of such study, which establishes the important link between face specific wetting behavior of crystalline pharmaceutical solids and the localized surface chemistry determined by X-ray photoelectron spectroscopy (XPS). The effects of milling on surface energetics were investigated using Inverse Gas Chromatography (IGC) at infinite dilution. Recently, we have developed a protocol based on IGC to investigate the surface energy heterogeneity (as a function of surface energy mapping). A comprehensive understanding of surface properties of pharmaceutical solids is of both a fundamental and practical importance in pharmaceutical product and process engineering (crystal habit, growth/dissolution, granulation, milling).