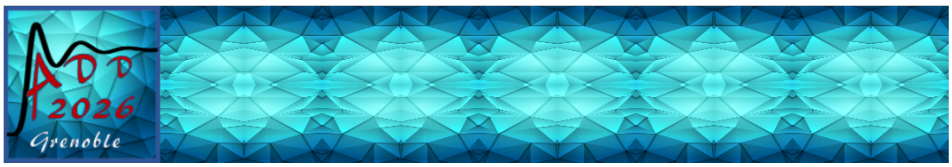

Abstract ID : **26**

Amorphous Pharmaceuticals

Content

Amorphous active pharmaceutical ingredients can possess a range of different intra- and inter-molecular interactions, that can directly enhance medicinal efficacy. Order of magnitude improvements in the solubility and bioavailability of orally taken amorphous drugs can be achieved compared to their crystalline forms. High Energy X-ray Diffraction (HEXRD) studies of amorphous pharmaceuticals is a relatively new application that uses 50-100keV photons to enable high-resolution investigations of organic materials, because x-rays are highly sensitive to the orientation of the molecular backbone in the Ångstrom to nanometer range. Amorphous forms of Indomethacin, Carbamazepine, Posaconazole, Cannabidiol, Nifedipine, Felodipine, water in PVP, as well as the amorphous solid dispersion Ketoprofen-PVP have been studied using HEXRD. The data are modeled using Empirical Potential Structure Refinement (EPSR) with the aid of chemical and molecular constraints provided by NMR and Raman spectroscopy. Our models attempt to establish the optimal intra-molecular rotations, librations and dihedral angles in the amorphous state, together with preferred inter-molecular bonding interactions. Quantitative coordination numbers arising from hydrogen bonding and aromatic ring interactions can be extracted, which in some cases show substantial variations between the liquid and glass. In addition, chain or ring distributions in the amorphous state can lead to new bonding patterns or molecular clusters not present in the crystalline polymorphs. The effects of humidity, temperature or preparation method on drug stability and storage will also be discussed.

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Comments:

none

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