

Layered Structure of A Multiple Hydrate-forming Pharmaceutical Compound

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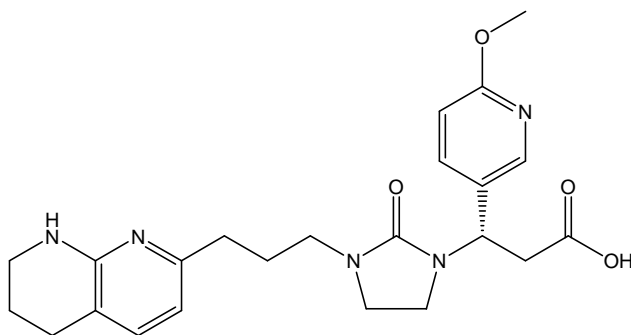
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Investigation of four hydrated forms and one anhydrous form of compound (**1**), a pharmaceutical compound, using both single-crystal and high-resolution powder X-ray diffraction methods revealed a two-dimensional framework. This framework, upon exposure to moisture, absorbed water between the layers, causing the lattice to expand by up to 20% of the axial length along *a*. The single-crystal structure was solved and refined for the pentahydrate form in space group *C2* with unit cell parameters *a*=36.961(5) Å, *b*=7.458(2) Å, *c*=20.691(4) Å, β =99.461(1)° and *V*=5626(4) Å³. In the single-crystal structure the water layers were parallel to the *bc* plane and sandwiched by the crystalline compound **1** framework. Upon a change of relative humidity, water moves in and out of the interlayer space with the retention of the layer structure of compound **1**. Starting from the anhydrous form, each additional water of hydration increased the interlayer spacing of the solid by ~1.3 Å, half the size of a water molecule. In an exploratory formulation, this expansion of interlayer spacing caused tablets to crack upon storage at high relative humidity.



Compound **1**