Supplementary Information

Weak interactions in cocrystals of isoniazid with glycolic and mandelic acids.

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Contenido

SPECTRAL ANALYSIS

The FT-IR spectra of the prepared compounds have been analyzed considering the structural characteristics observed in the crystallographic study and the characteristic frequencies of the starting compounds, in addition to available spectroscopic data of inh cocrystals with carboxylic acids. The functional groups in **inh** are, amide C=O, primary and secondary NH, and pyridine N, which exhibit IR stretch frequencies at 3303 cm^{-1} and 3211 cm^{-1} (primary amine, NH stretch), 3111 cm^{-1} (amine secondary, NH stretch), 1667 cm^{-1} (amide C=O stretch) and 1334 cm^{-1} (pyridine ring C=N) [1]. For α-hydroxycarboxylic acids, the C=O carbonyl stretch of carboxylic acid (COOH) normally shows a strong band at 1750-1680 cm^{-1}, while the carboxylate anion (COO^{-}) has two coupled carbonyl absorption bands characteristics at 1600 cm^{-1} for asymmetric and 1400 cm^{-1} for symmetric stretch [2].

Distinct differences, within the IR spectra, can be observed between a neutral carboxylic acid moiety and a carboxylate anion. A neutral carboxylate (-COOH) displays a strong C=O stretching band around 1700 cm^{-1} and a weaker C-O stretch around 1200 cm-1, while a carboxylate anion (-COO-), due to resonance, displays a single C-O stretch in the fingerprint region of 1000-1400 cm^{-1}. Additionally, if a neutral intermolecular O-H· · ·N hydrogen bond has formed between the components, then two broad stretches around 2450 and 1950 cm^{-1} will be observed [3]. In **1** The presence of two strong bands at 1726 cm^{-1} and 1668 cm^{-1} is assigned to the stretching vibration modes of C=O groups (carboxylic and amide), and in **2**, the presence of a band at 1689 cm^{-1} with a shoulder at 1702 cm^{-1} is assigned to the stretch vibration modes of the C = O groups., whereas the carboxylate anion (COO^{-}) has two characteristic coupled carbonyl absorption bands at 1600 cm^{-1} for asymmetric and 1454-1414 cm^{-1} for symmetric stretch. The stretching and bending modes of NH^{3+} groups appears via the two bands at 3194 cm^{-1} and 1494 cm^{-1}, respectively. The stretching frequencies of functional groups in the inh molecule, appear shifted in the FT-IR spectra of the two cocrystals, also confirming the formation of novel solid forms. The FTIR spectrum of **3** shows the characteristic stretching vibration modes of the molecule of water of crystallization (3423 cm^{-1}), NH (3080 cm^{-1}), CH$_3$ (3031 cm^{-1}), C=N (1938 cm^{-1}) and C=O (1655 cm^{-}1), affected by the participation in the formation of various hydrogen bonds.

References.

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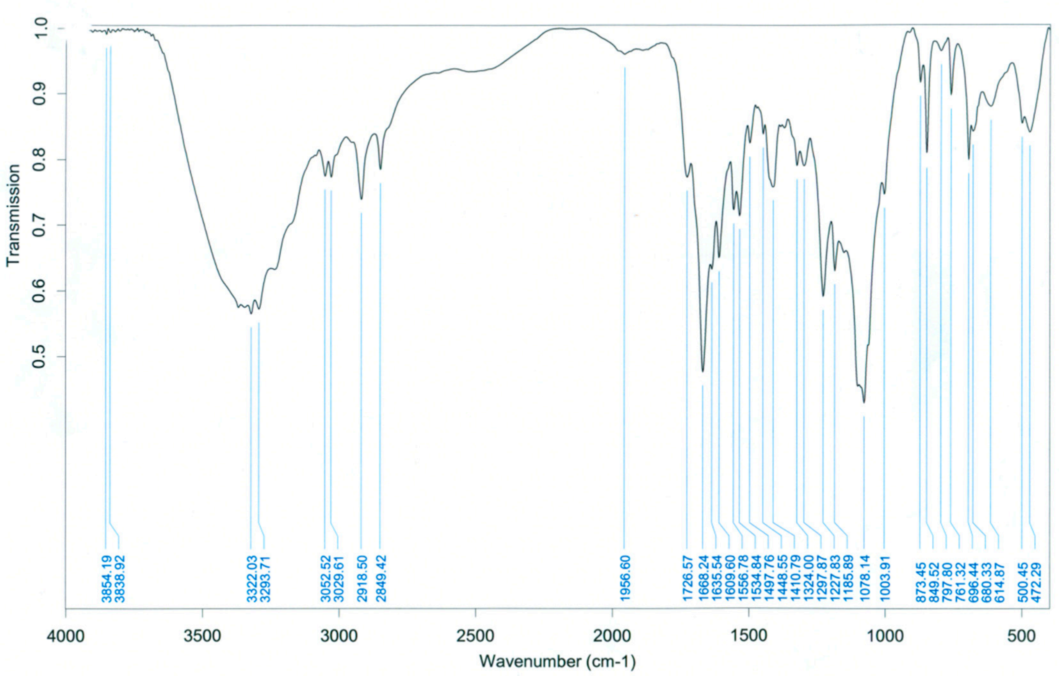
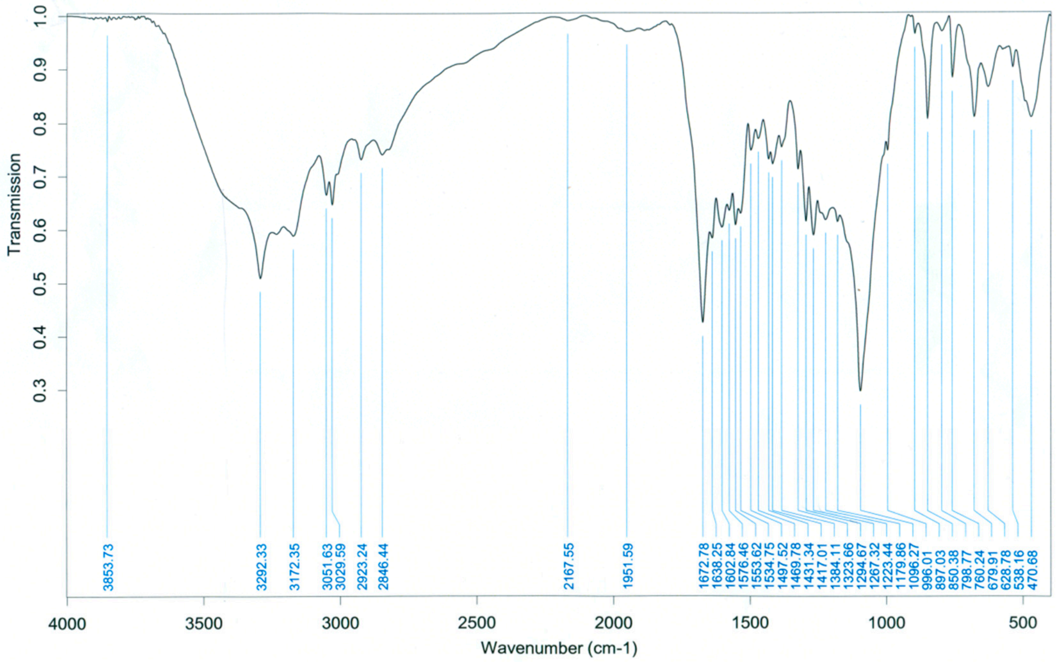
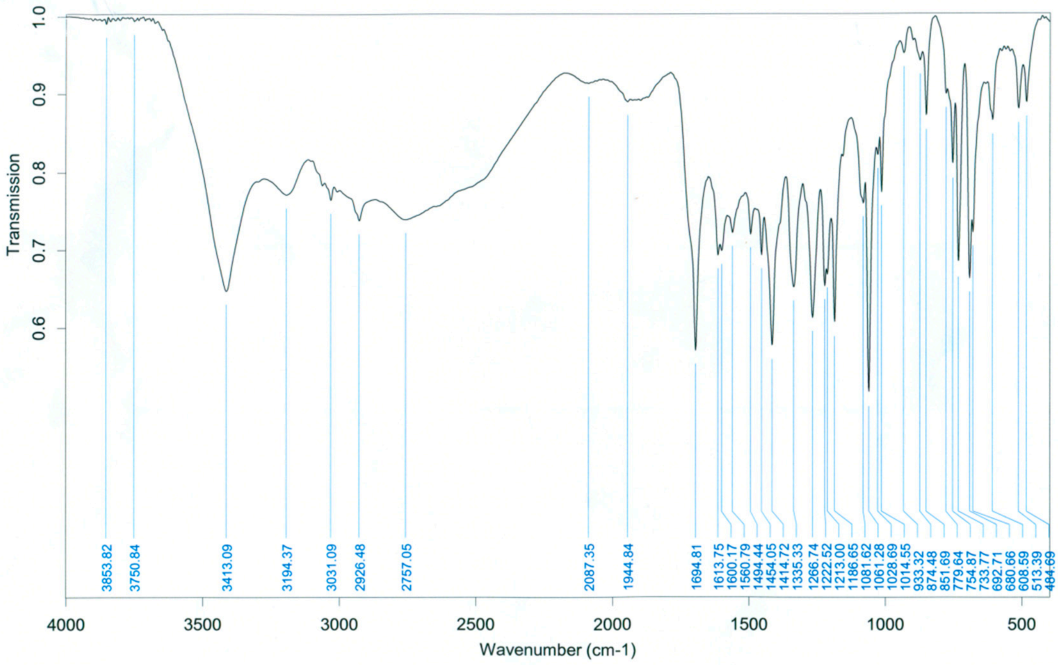
FT-IR spectrum of (inh)·(H_2ga) (1) (cyclohexane)



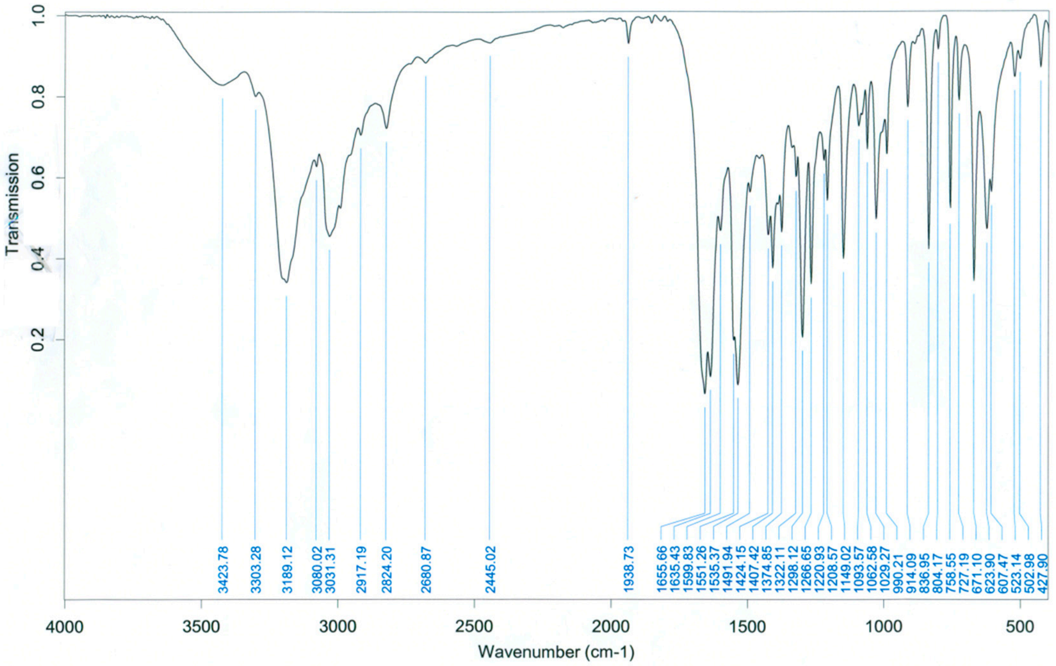
FT-IR spectrum of (inh)·(H_2ga) (1) (ethyl acetate)



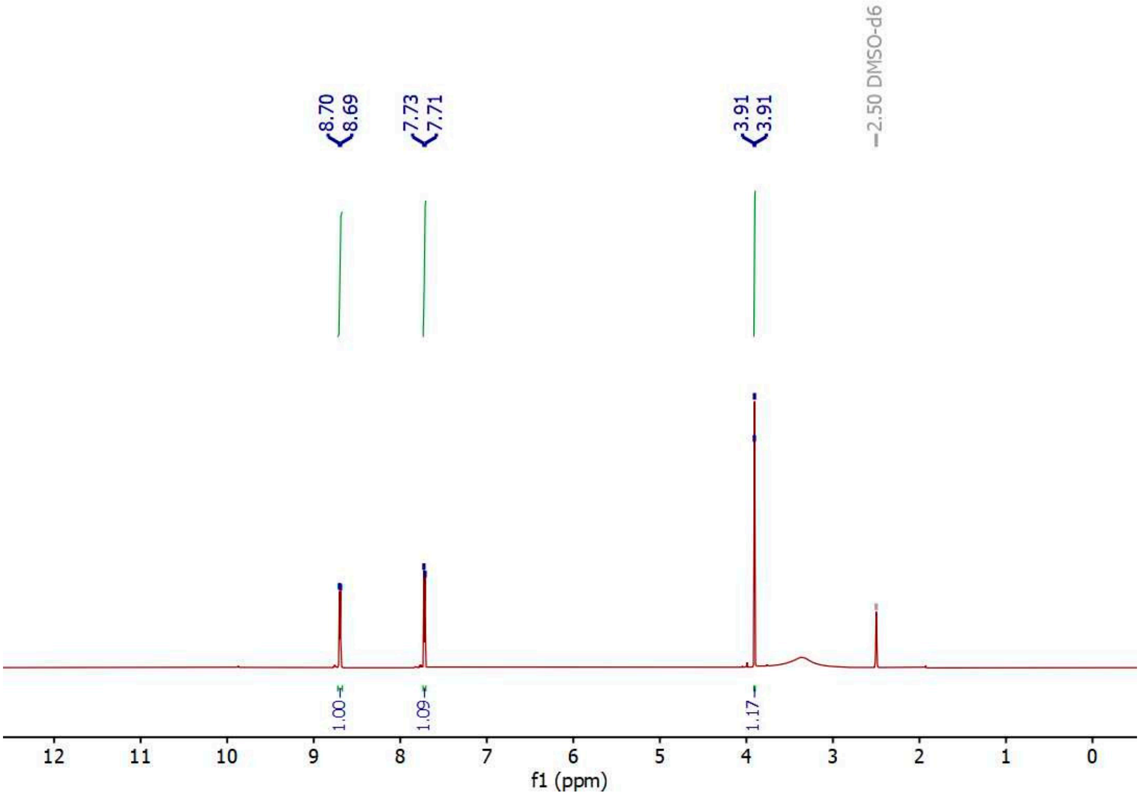
FT-IR spectrum of $[\mathrm{Hinh}]^{+}[\mathrm{Hma}]^{-}\cdot(\mathrm{H_2ma})$ (2)



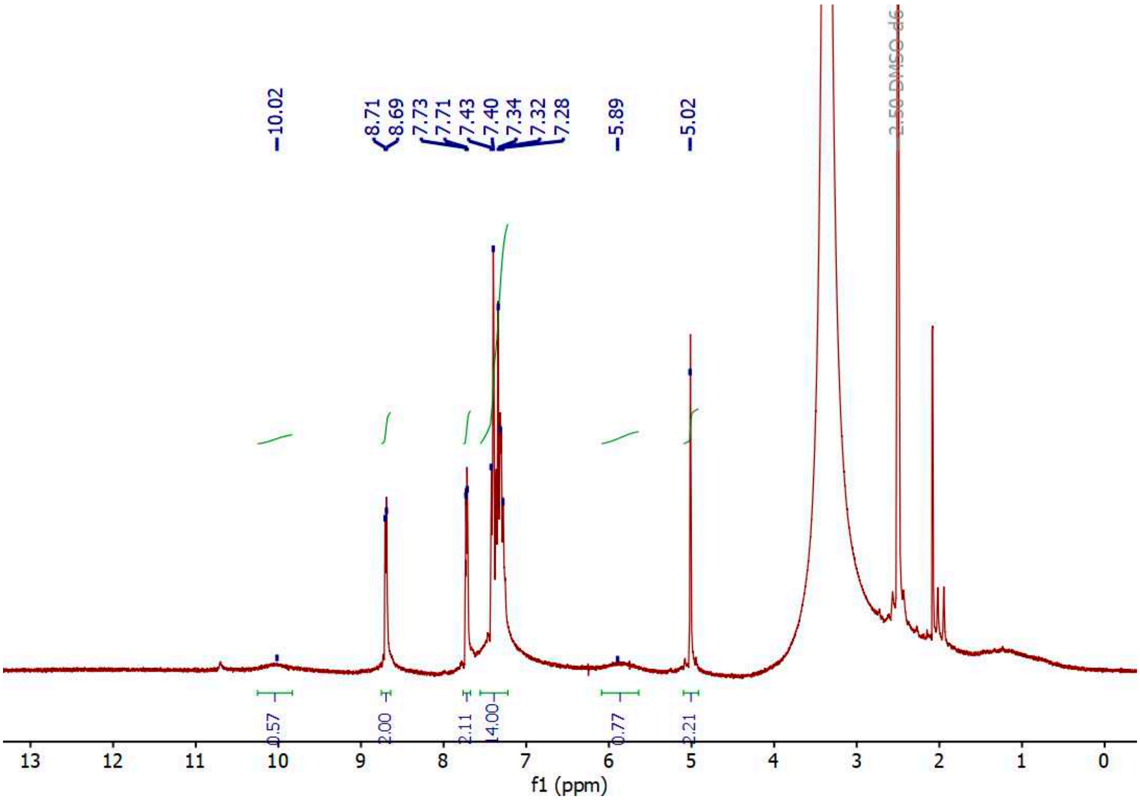
FT-IR spectrum of (pinh)·1/2(H_2O) (3)



^{1}H NMR spectrum (inh)·(H_2ga) (1)



^{1}H NMR spectrum $[Hinh]^+[Hma]^- \cdot (H_2ma)$ (2)



^{1}H NMR spectrum (pinh)·1/2(H_2O) (3)