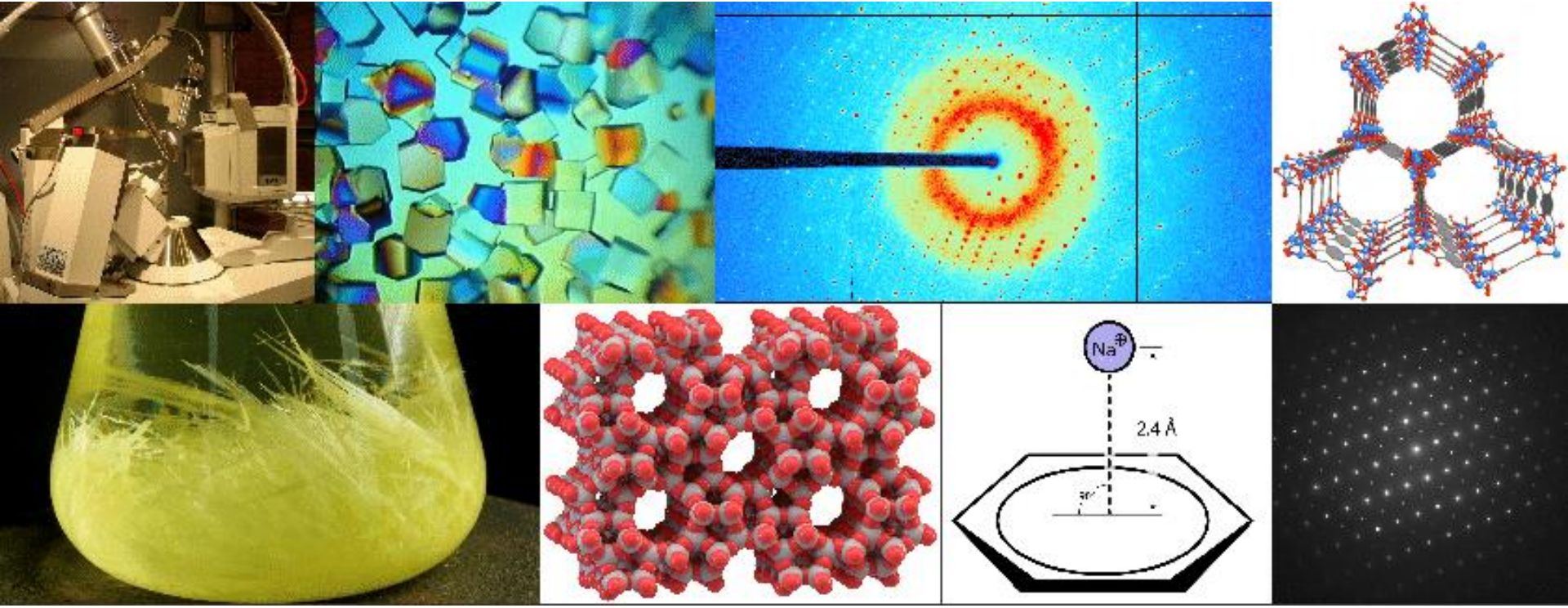


Materia Optativa de Grado y Postgrado | 2do CUATRIMESTRE 2023

CRISTALOGRAFÍA

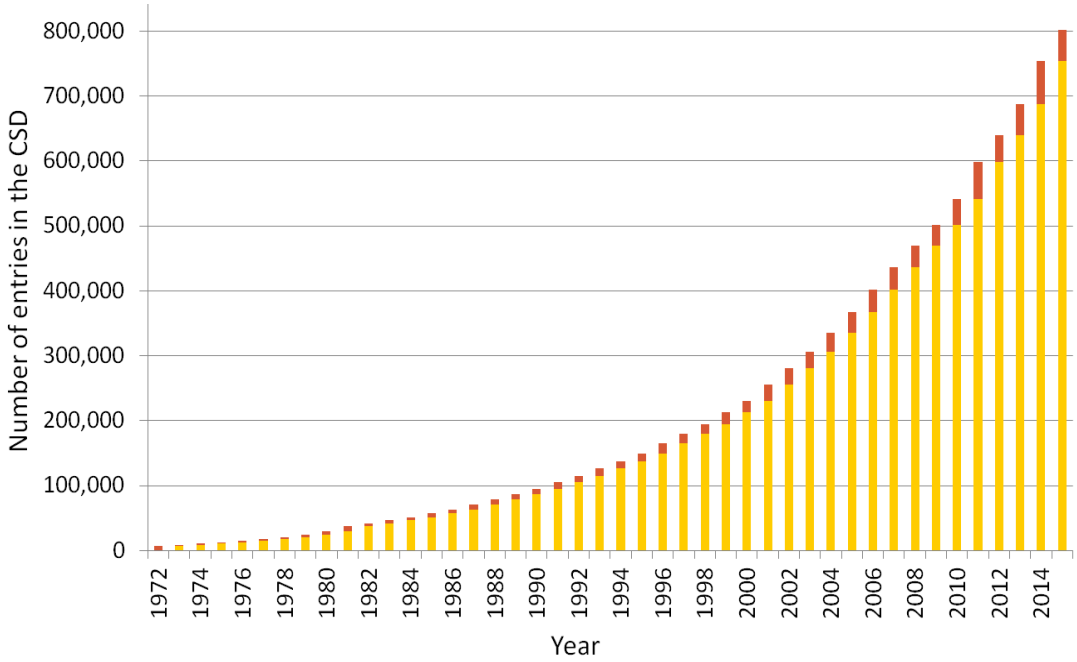
Fundamentos y Aplicaciones

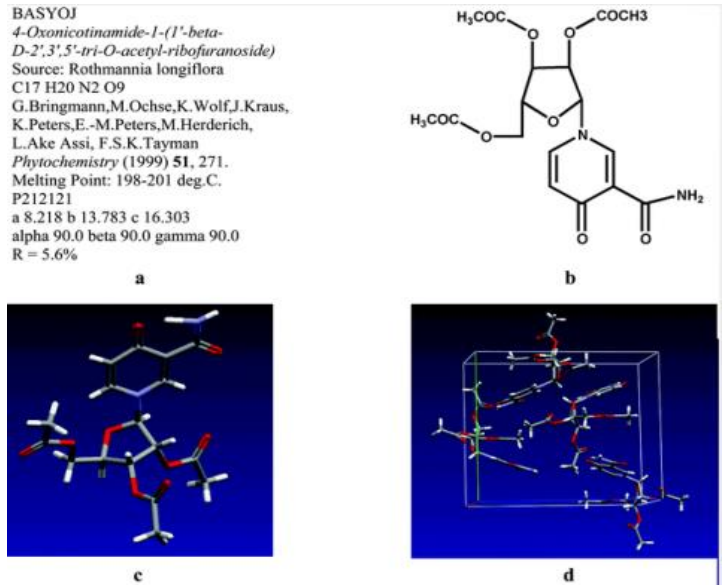
CLASE III

Florencia Di Salvo | Sebastián Suárez

Departamento de Química Inorgánica, Analítica y Química Física, FCEN, UBA

Base de Datos





Cambridge Structural Data Base (CSD)

La base de datos de Cambridge contiene los datos estructurales cristalográficos derivados de estudios de difracción de rayos X o neutrones en compuestos orgánicos, organometalicos y complejos metálicos. Esta base de datos excluye proteínas, polímeros de alto peso molecular y sales puramente inorgánicas. Cada una de las entradas se identifica con un código de referencia de **8 caracteres (REFCODe)** y contiene información bibliográfica que especifica la referencia de la revista, autores y nombre del compuesto

Base de Datos

Understanding Polymorph Stability

using Full Interaction Maps

An understanding of the relative stabilities of observed crystal forms may be gained by examining how satisfied the preferred intermolecular interactions are in the lattice.

An understanding of the relative stability of a compound's crystal form can be crucial if it is a candidate for a drug product. There have been occurrences in which a later emergence of a more stable polymorphic form has caused withdrawal of a drug product from the market, costing the manufacturers hundreds of millions of dollars; ritonavir is the classic example of this[1]. Use of the Cambridge Crystallographic Data Centre (CCDC) Full Interaction Maps tool can help bolster this understanding and mitigate this risk.

The Full Interaction Maps capability relies upon the

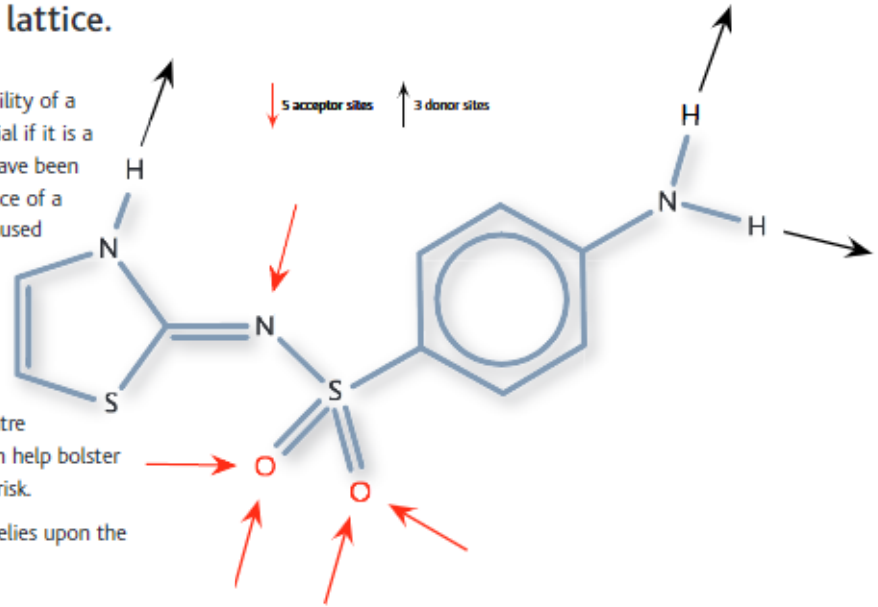


Fig. 1: The 2D chemical structure of sulfathiazole, showing available acceptor and donor interactions

Base de Datos

Designing a New Multi-Component API Form Based on a Known Structure

Aim

This use case addresses the topic of how to design new multi-component, crystalline forms of an API purely based on the knowledge of one or more existing forms. The production of new multi-component forms will allow the physico-chemical properties of the solid to be modified (e.g. solubility, crystal habit and stability) without changing the biological efficacy of the API compound. If an isostructural series of API forms can be generated in this way, then tuning of physical properties may even be feasible.

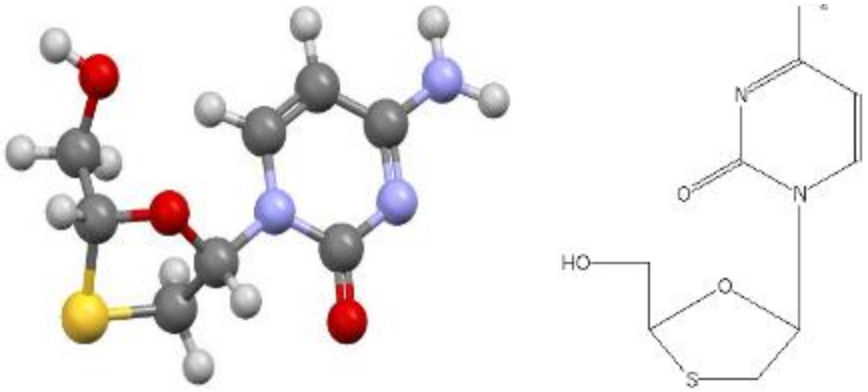
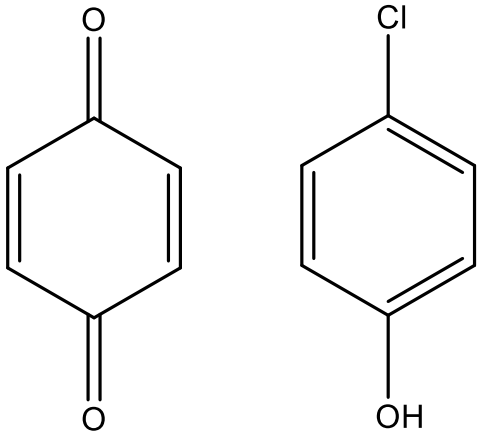
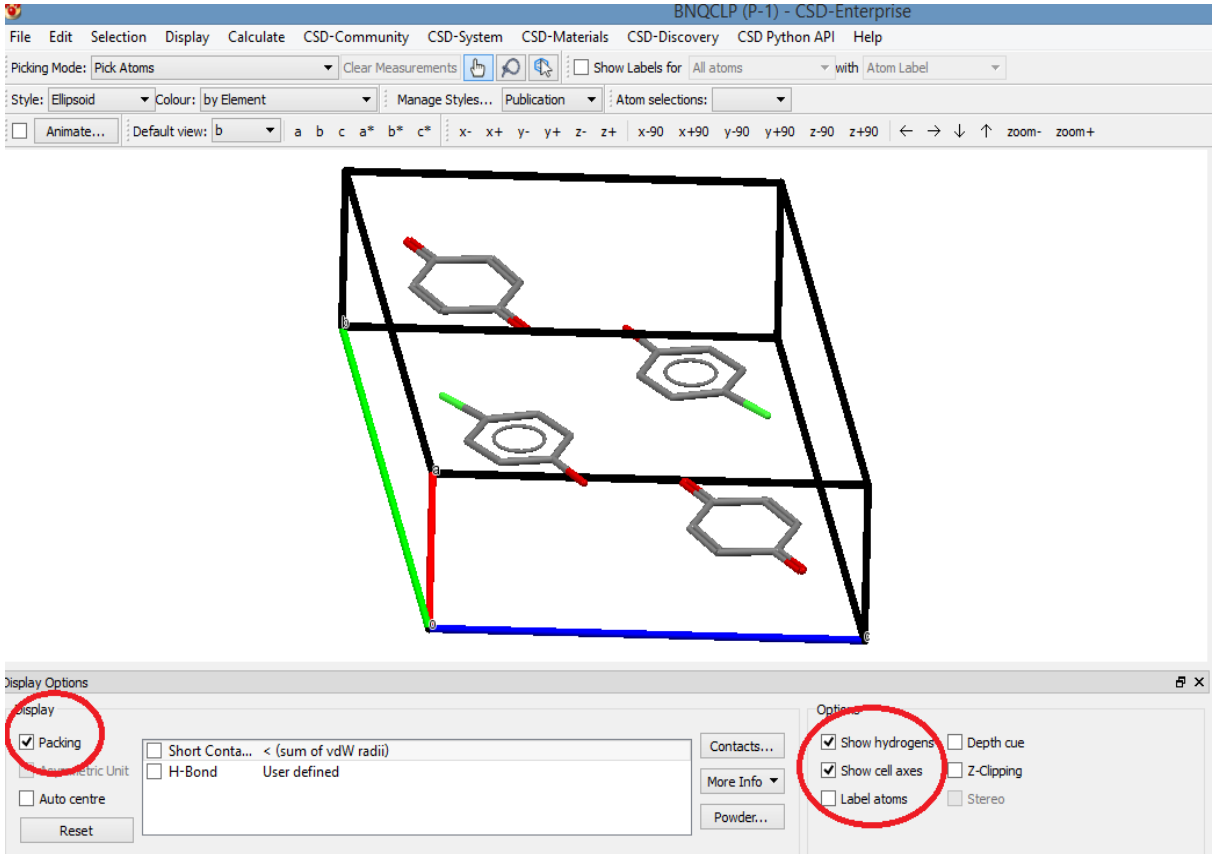


Figure 1 - Lamivudine chemical structure

Mercury

Se buscaran interacciones intermoleculares en el **co-cristal de *p*-benzoquinona y *p*-clorofenol**.





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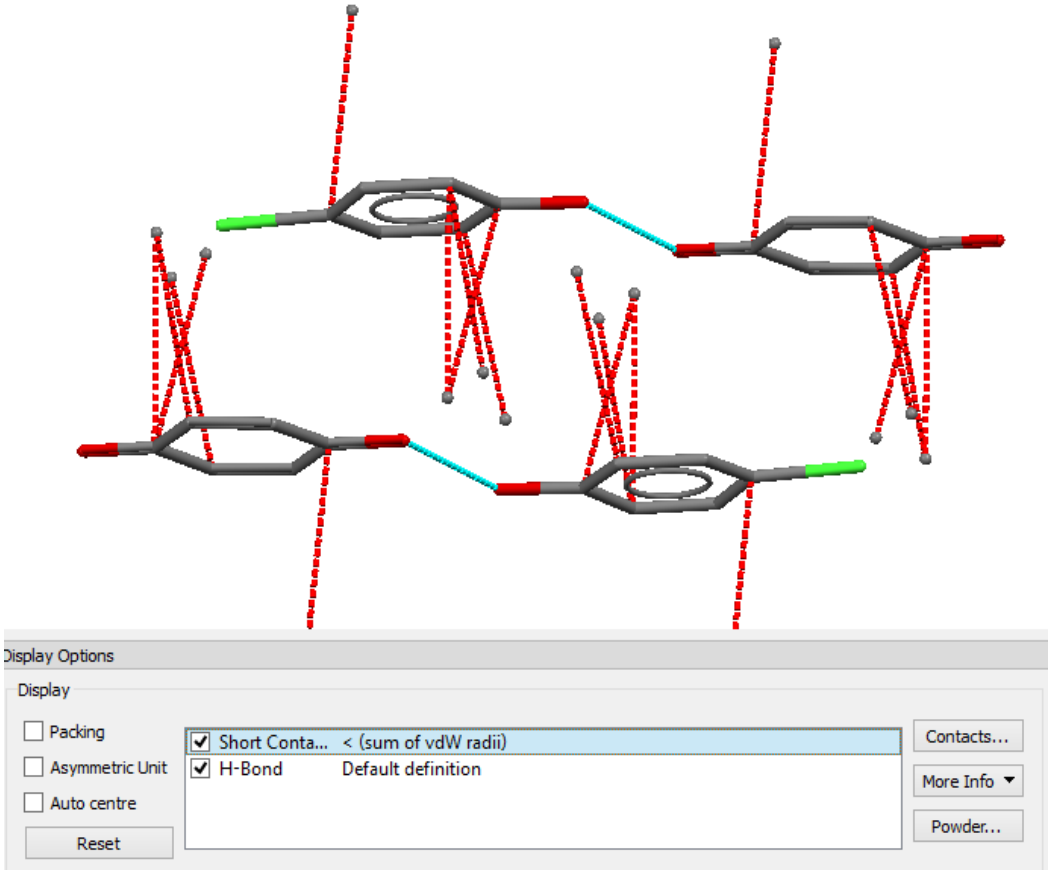

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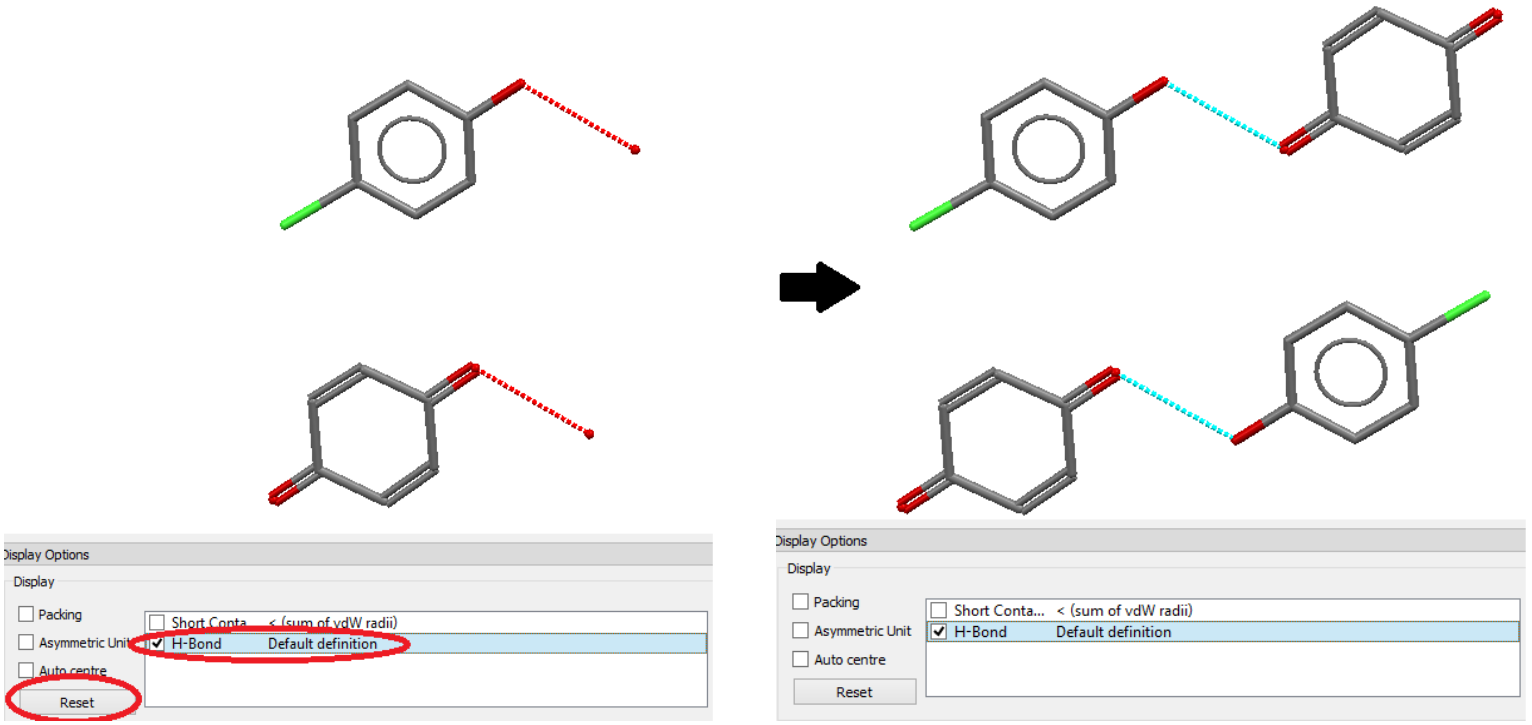

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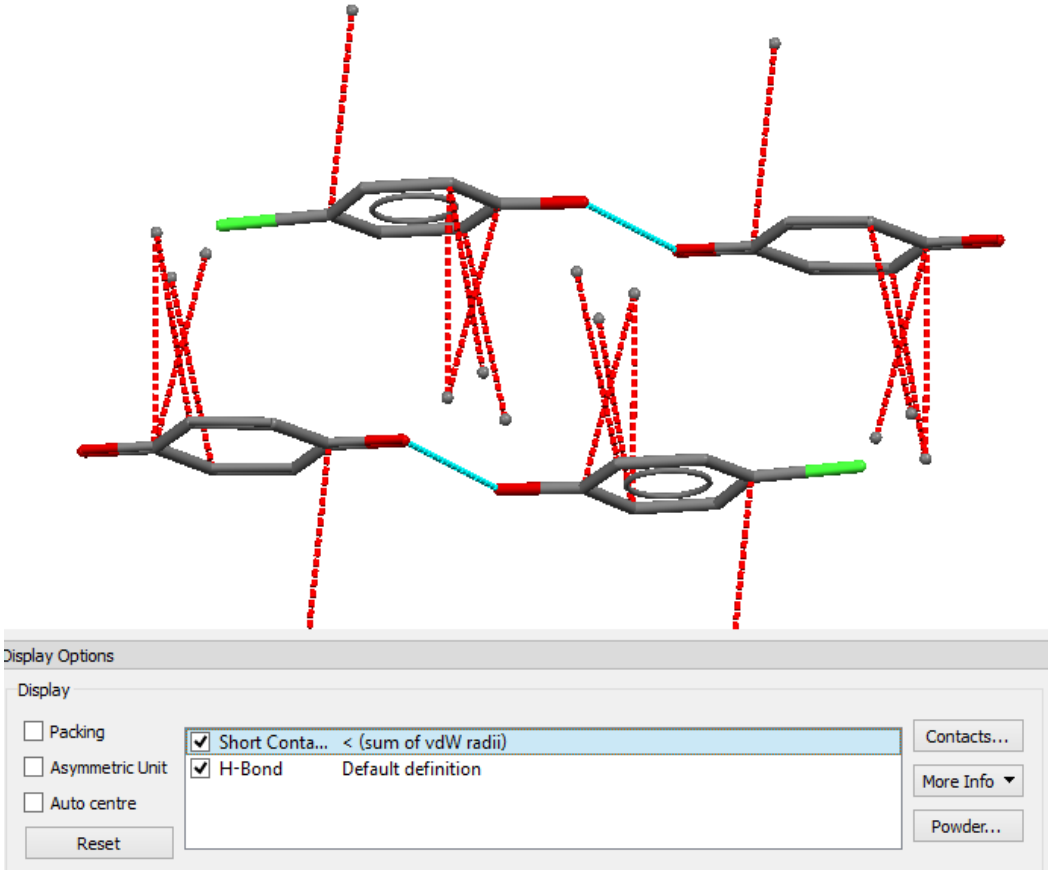

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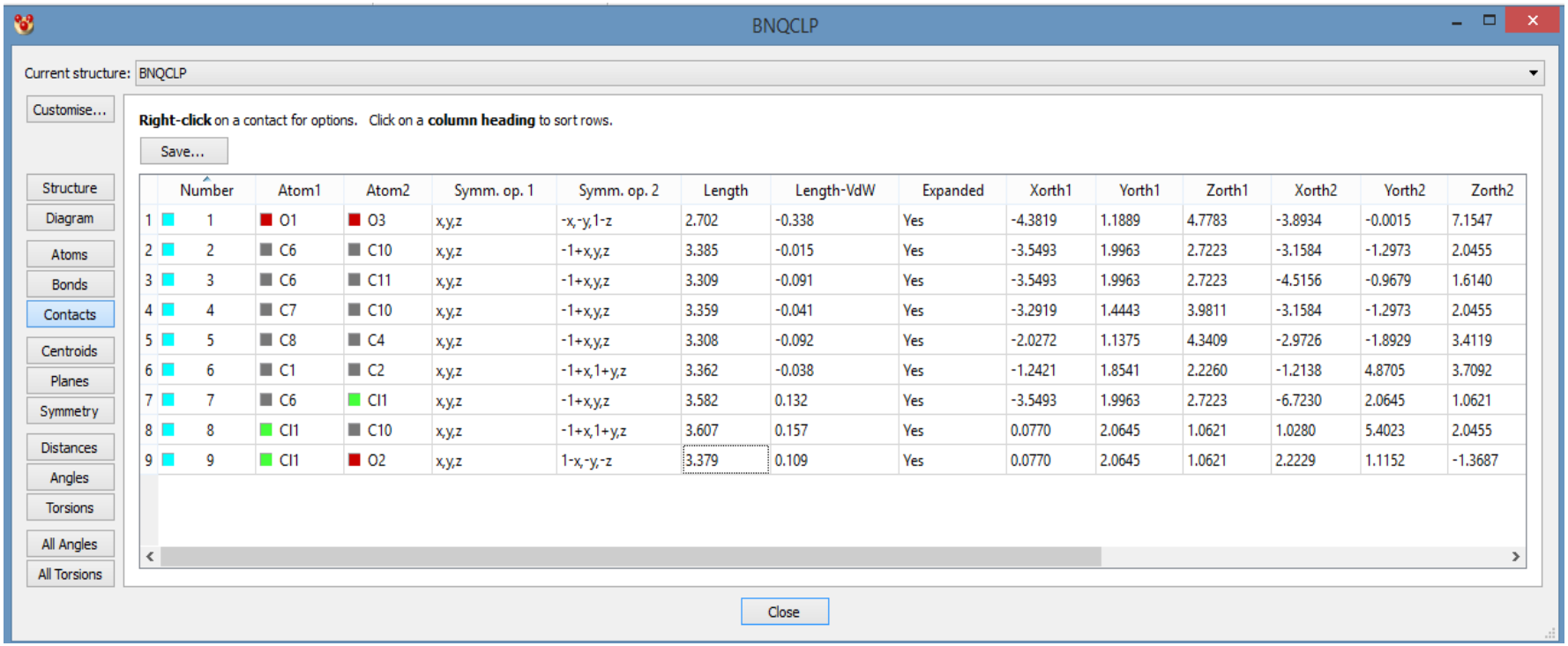
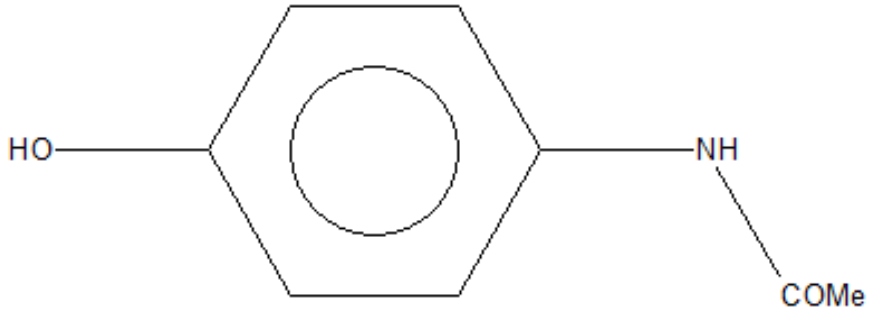


	Number	Atom1	Atom2	Symm. op. 1	Symm. op. 2	Length	Length-VdW	Expanded	Xorth1	Yorth1	Zorth1	Xorth2	Yorth2	Zorth2
1	1	O1	O3	x,y,z	-x,-y,1-z	2.702	-0.338	Yes	-4.3819	1.1889	4.7783	-3.8934	-0.0015	7.1547
2	2	C6	C10	x,y,z	-1+x,y,z	3.385	-0.015	Yes	-3.5493	1.9963	2.7223	-3.1584	-1.2973	2.0455
3	3	C6	C11	x,y,z	-1+x,y,z	3.309	-0.091	Yes	-3.5493	1.9963	2.7223	-4.5156	-0.9679	1.6140
4	4	C7	C10	x,y,z	-1+x,y,z	3.359	-0.041	Yes	-3.2919	1.4443	3.9811	-3.1584	-1.2973	2.0455
5	5	C8	C4	x,y,z	-1+x,y,z	3.308	-0.092	Yes	-2.0272	1.1375	4.3409	-2.9726	-1.8929	3.4119
6	6	C1	C2	x,y,z	-1+x,1+y,z	3.362	-0.038	Yes	-1.2421	1.8541	2.2260	-1.2138	4.8705	3.7092
7	7	C6	Cl1	x,y,z	-1+x,y,z	3.582	0.132	Yes	-3.5493	1.9963	2.7223	-6.7230	2.0645	1.0621
8	8	Cl1	C10	x,y,z	-1+x,1+y,z	3.607	0.157	Yes	0.0770	2.0645	1.0621	1.0280	5.4023	2.0455
9	9	Cl1	O2	x,y,z	1-x,-y,-z	3.379	0.109	Yes	0.0770	2.0645	1.0621	2.2229	1.1152	-1.3687

Interacciones y Polimorfos

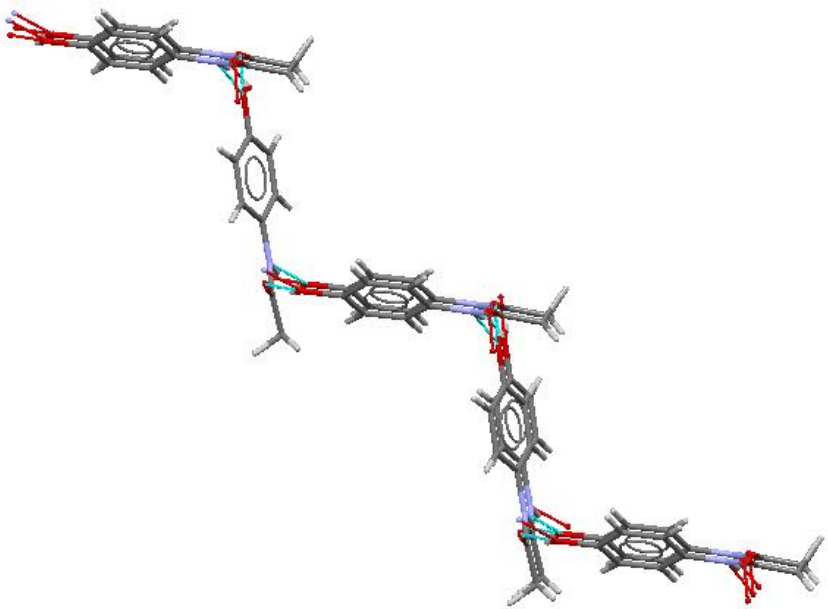
Acetaminofen – Paracetamol

3 Polimorfos principales (Formas I-III)
Más de 25 cocristales e hidratos

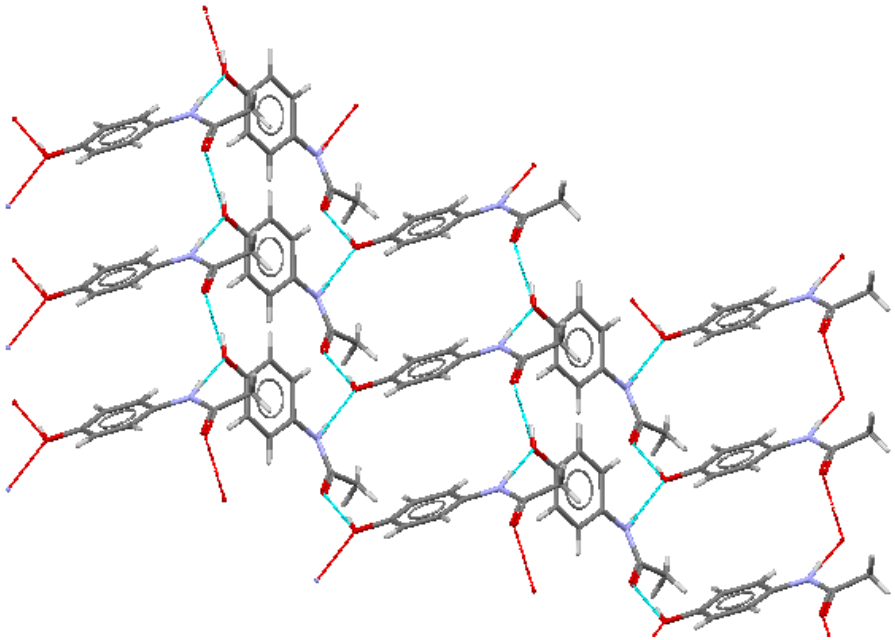


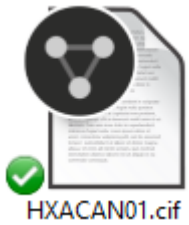
Evaluar las interacciones en los 2 polimorfos, y su packing 3D

Interacciones y Polimorfos



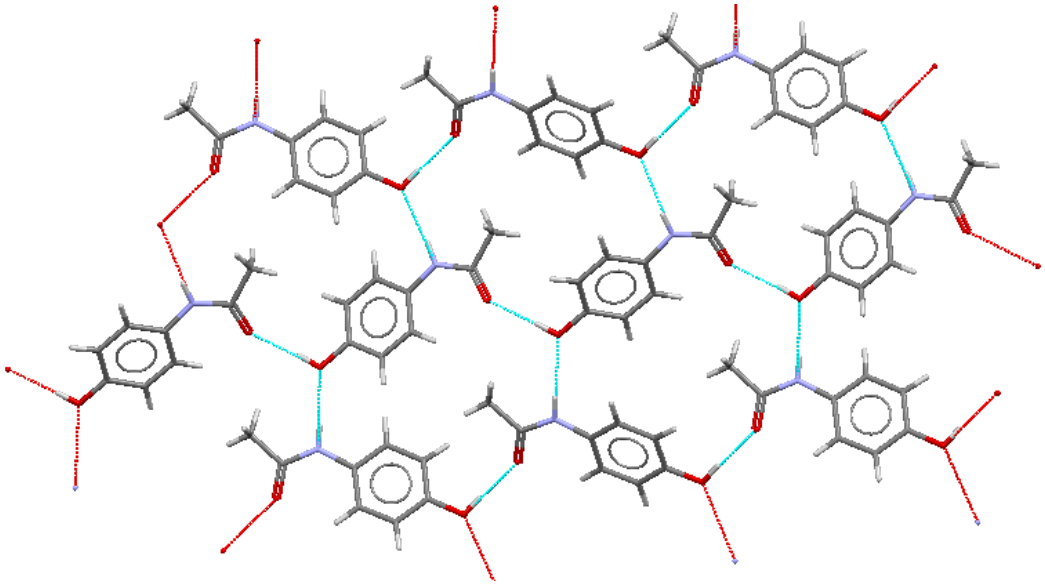
Forma I
monoclínico





Interacciones y Polimorfos

Forma II
ortorrómbico



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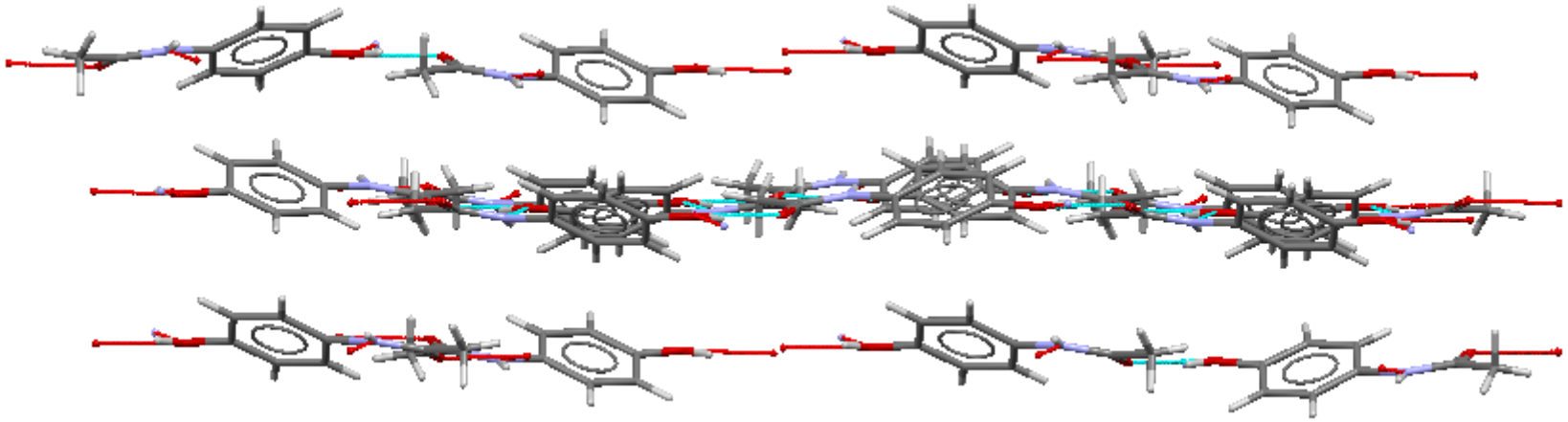
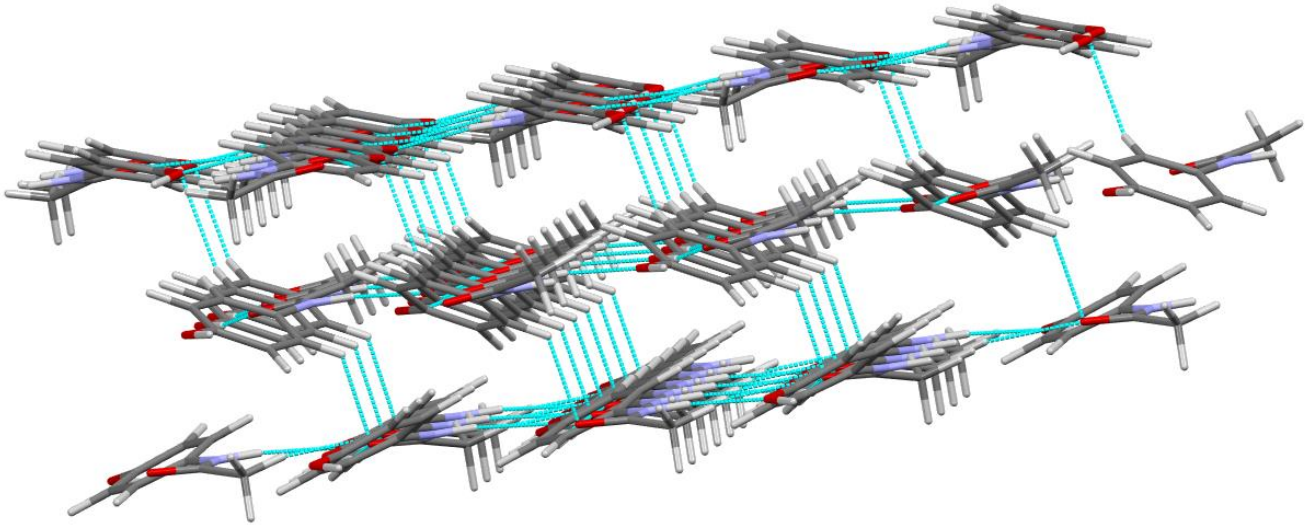
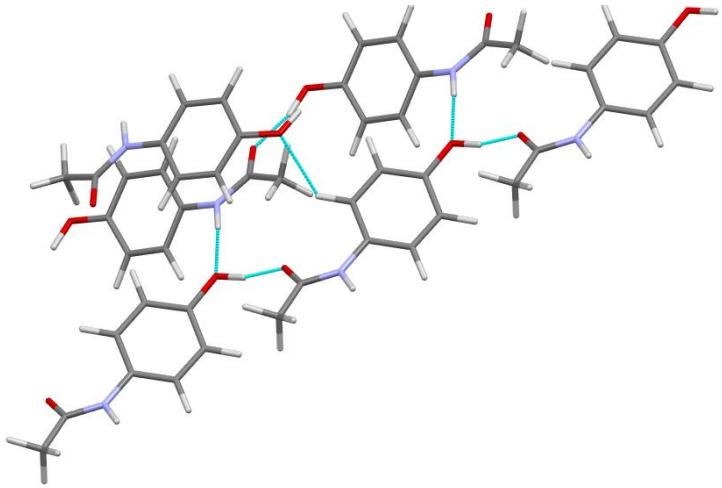


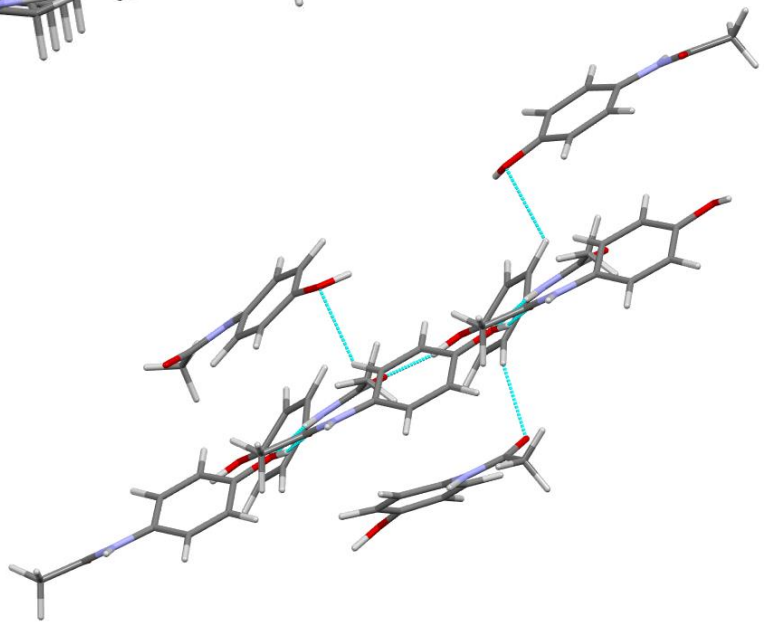
Interacciones y Polimorfos

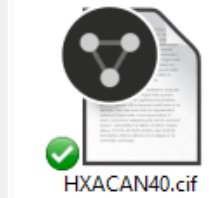
Forma III - metaestable

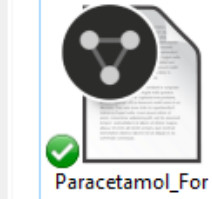
Ortorrómbico (resuelta de datos de DRX de polvo)











Interacciones y Cocristales

CrystEngComm

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PAPER

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'Masked synthons' in crystal engineering: insulated components in acetaminophen cocrystal hydrates†

Cite this: DOI: 10.1039/c3ce40159f

John R. G. Sander,[a] Dejan-Krešimir Bučar,[a] Rodger F. Henry,[b] Brittany N. Giangiorgi,[a] Geoff G. Z. Zhang*[c] and Leonard R. MacGillivray*[a]

Received 24th January 2013,
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www.rsc.org/crystengcomm

A series of cocrystals of acetaminophen and *trans*-1,2-bis(4-pyridyl)ethylene are reported wherein there is a lack of direct hydrogen-bonding between the components owing to interjected water molecules. A survey of the Cambridge Structural Database demonstrates that interjected water molecules involving cocrystals with similar components are rare. We term the lack of interaction as a 'masked synthon', which we aim to contribute to the development of synthon theory in organic solid-state chemistry.

Sinton

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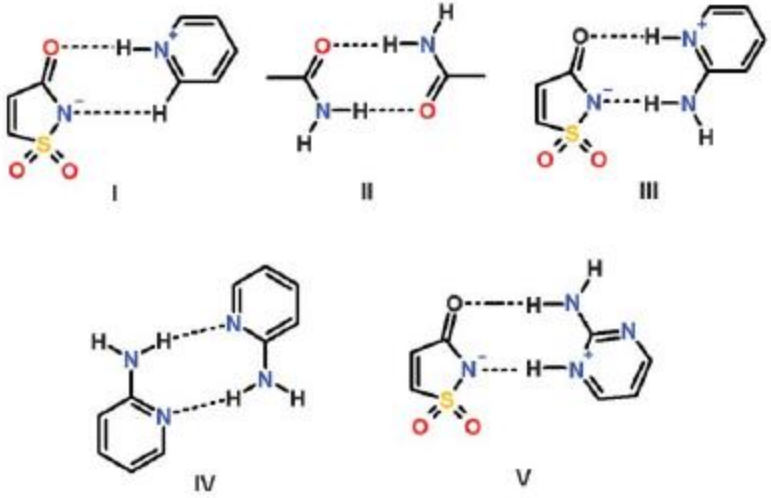
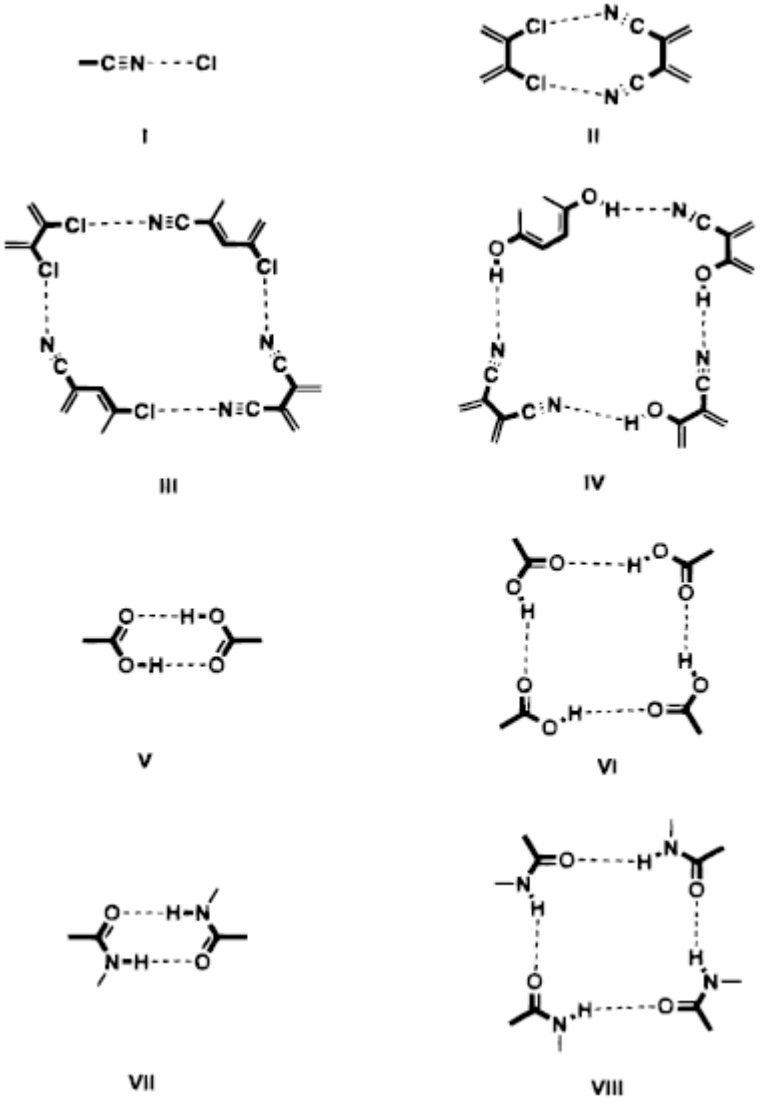
Sinton





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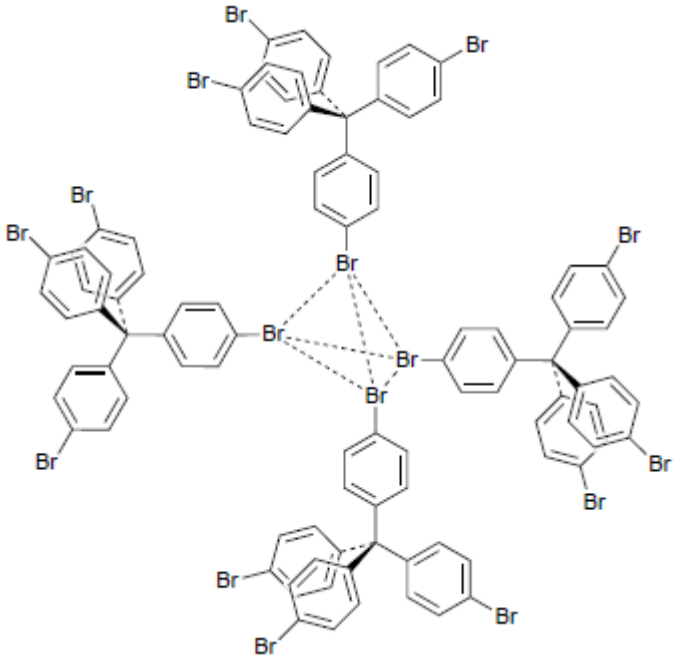

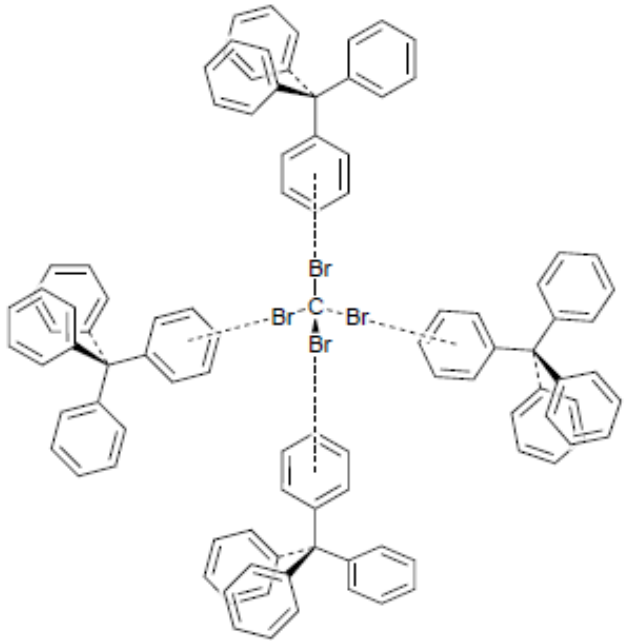

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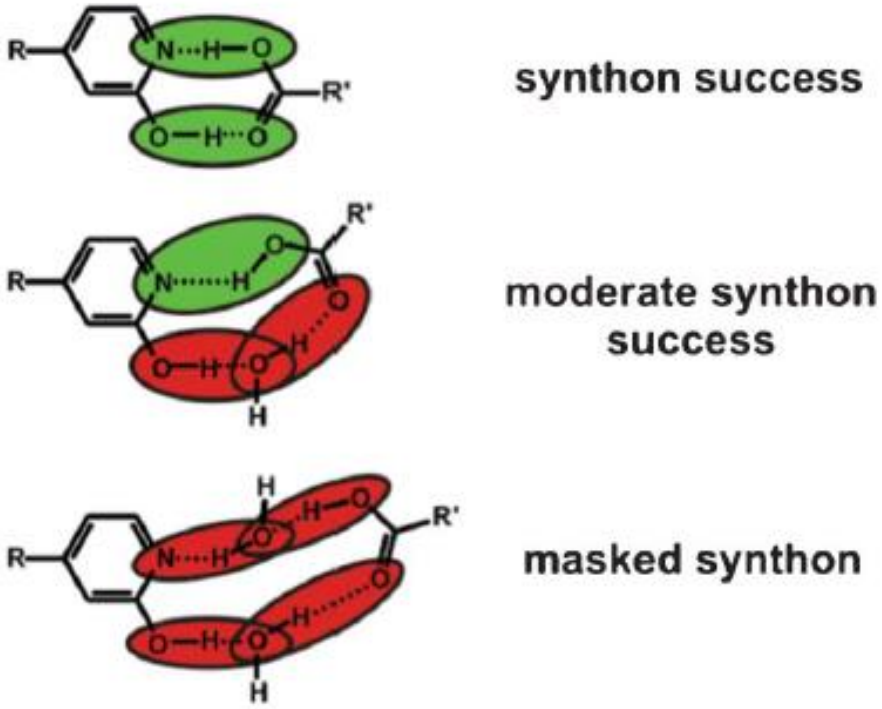
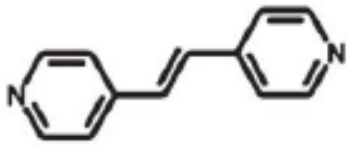
Interacciones y Cocristales

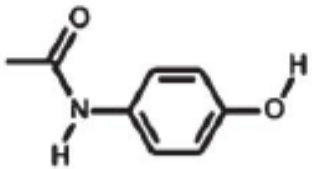


Scheme 1 Comparisons of supramolecular synthons.

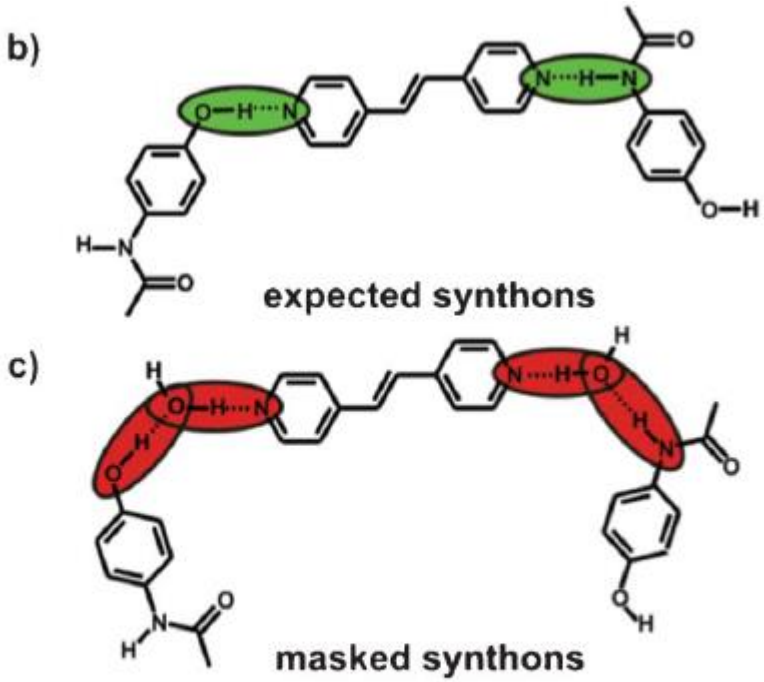
Interacciones y Cocristales



BPE



APAP



Scheme 2 (a) APAP and BPE, (b) expected heterosynthons, and (c) masked synthons formed by interjected water molecules.

Interacciones y Cocristales

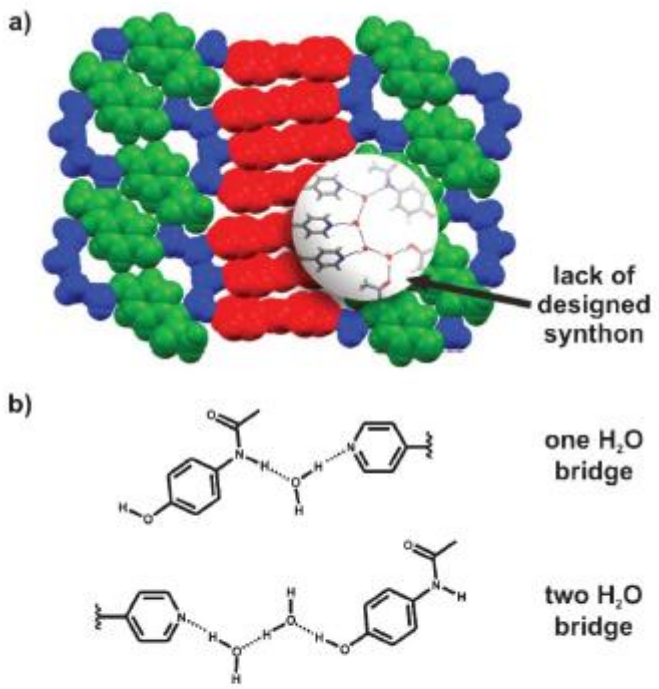


Fig. 1 X-ray structure of **1**: (a) 2D network viewed along *a*-axis and (b) schematics of water molecules.

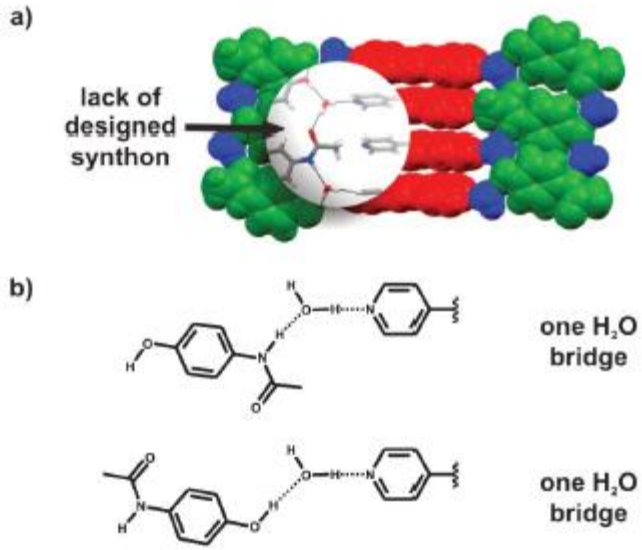


Fig. 2 X-ray structure of **2**: (a) along *a*-axis to show 2D network (free pyridyl group also present in solid) and (b) water bridges.

Interacciones y Cocristales

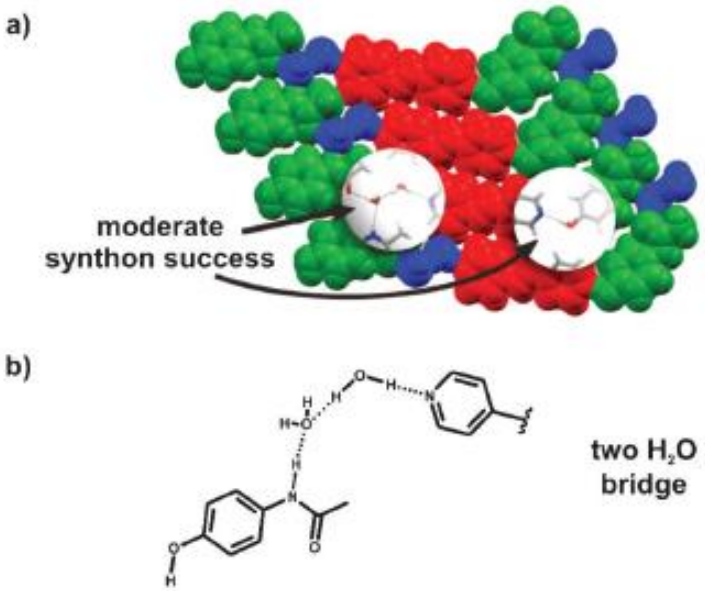


Fig. 3 (a) X-ray structure of **3** along *c*-axis to reveal 2D sheets composed of wave-like chains and (b) a water dimer that bridges the amide-to-pyridine heterosynthon.

Fig. 4 X-ray structure of **4** showing 1D ladder along *c*-axis.