Electronic Supporting Information (ESI)

Correlating the melting point alteration with the supramolecular structure in Aripiprazole drug cocrystals.

Jagadeesh Babu Nanubolu* and Krishnan Ravikumar*

Centre for X-ray Crystallography, CSIR-Indian Institute of Chemical Technology, Hyderabad, India, 500607. Corresponding author: E-mail: jagadeesh81@gmail.com and sshiya@yahoo.co.in Telephone: +91 (0) 4027193118 Fax +91 (0)4027193118.

Table S1. Important vibrational modes observed in aripiprazole and its cocrystals. All peak positions are referred in cm^{-1} unit scale.

Solid form	C=O stretch	N-H stretch	O-H stretch	C-H stretch	C=C stretch
Aripiprazole	1679	3471 3322	-	3196	1625
Aripiprazole-Resorcinol, I	1653	3298	3584 , 3487 3000-3500 (broad)	3198	1626
Aripiprazole-Catechol, II	1673	3316	3633, 3528 3000-3500 (broad)	3198	1626
Aripiprazole-Hydroquinone, III	1663	3319	3000-3500 (broad)	3197	1626
Aripiprazole-Pyrogallol, IV	1652	3295	3659, 3555 3000-3500 (broad)	3197	1627
Aripiprazole-Phloroglucinol, V	1652	3289	3646, 3575, 3491 , 3000-3500 (broad)	3198	1626

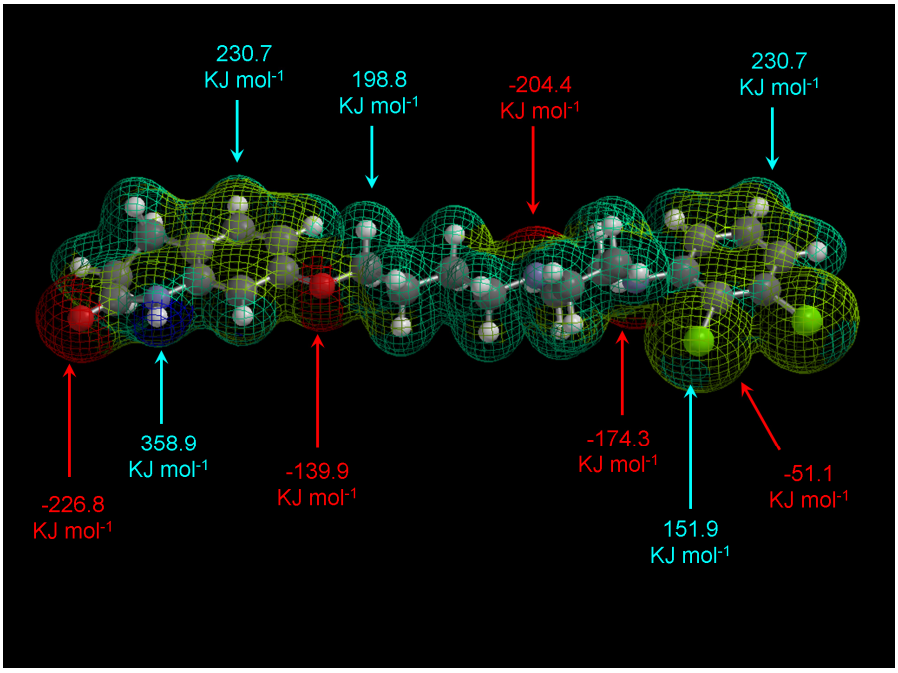


Fig.S1 Electrostatic surface potential (ESP) map on the energy minimized structure of aripiprazole. The red regions indicate electron rich and blue region indicates electron deficient and the colors from blue to green forms the continuum. The chlorine atoms play a dual role of both donor and acceptor due to the anisotropy of the electron distribution on the chlorine atom with -51.1 KJ mol^{-1} at the periphery and +151.9 KJ mol^{-1} at the centre of the halogen atom.

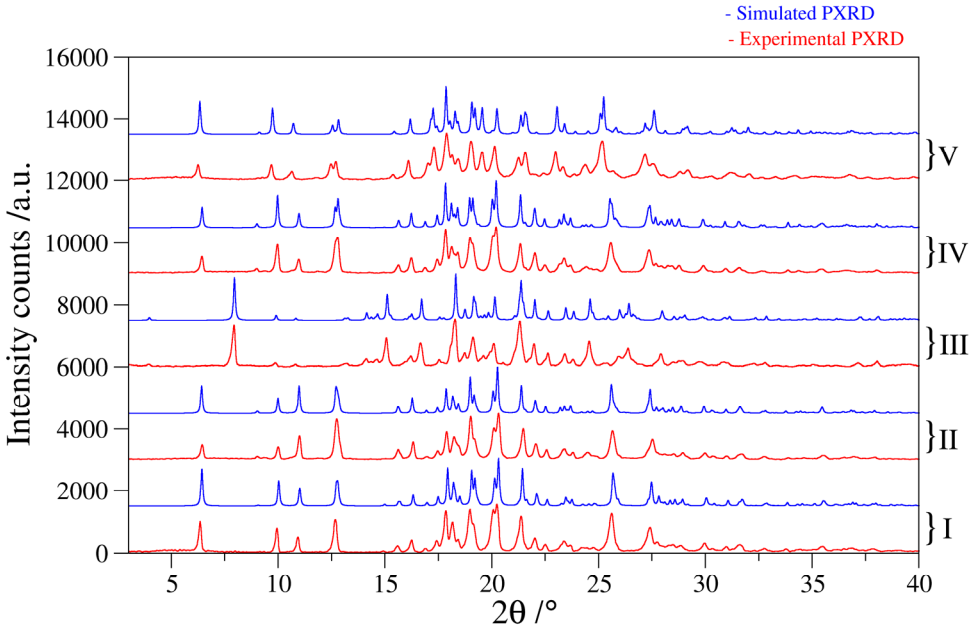
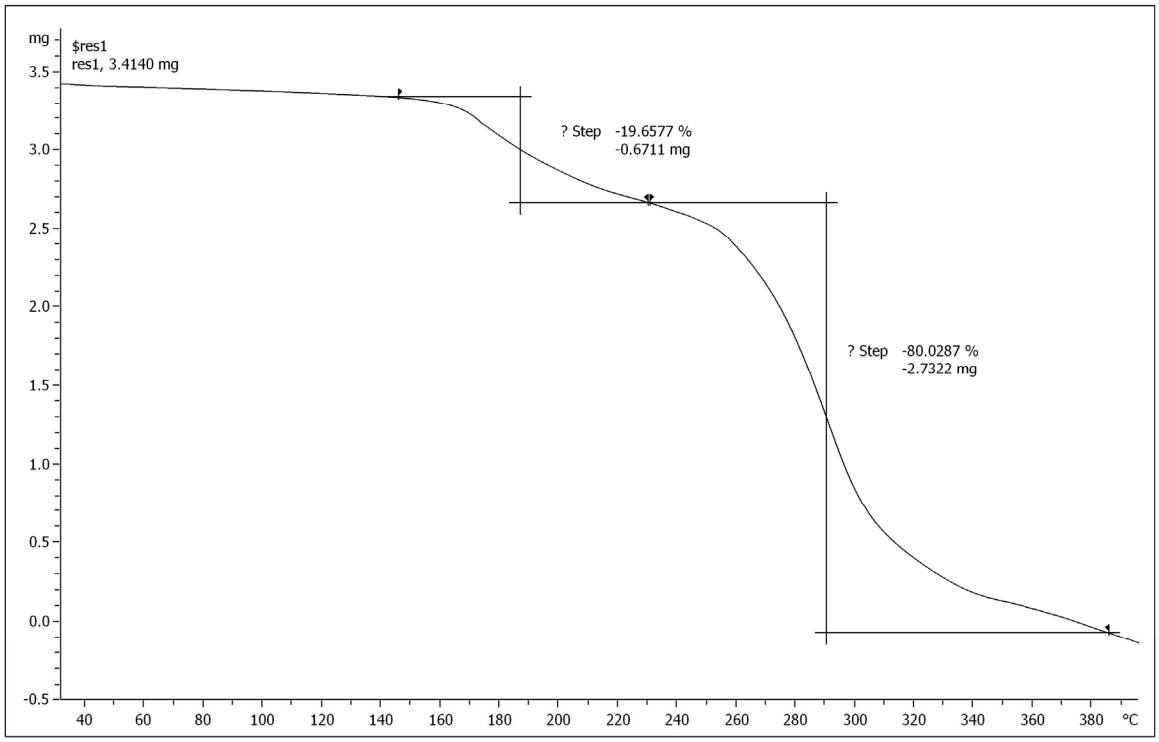
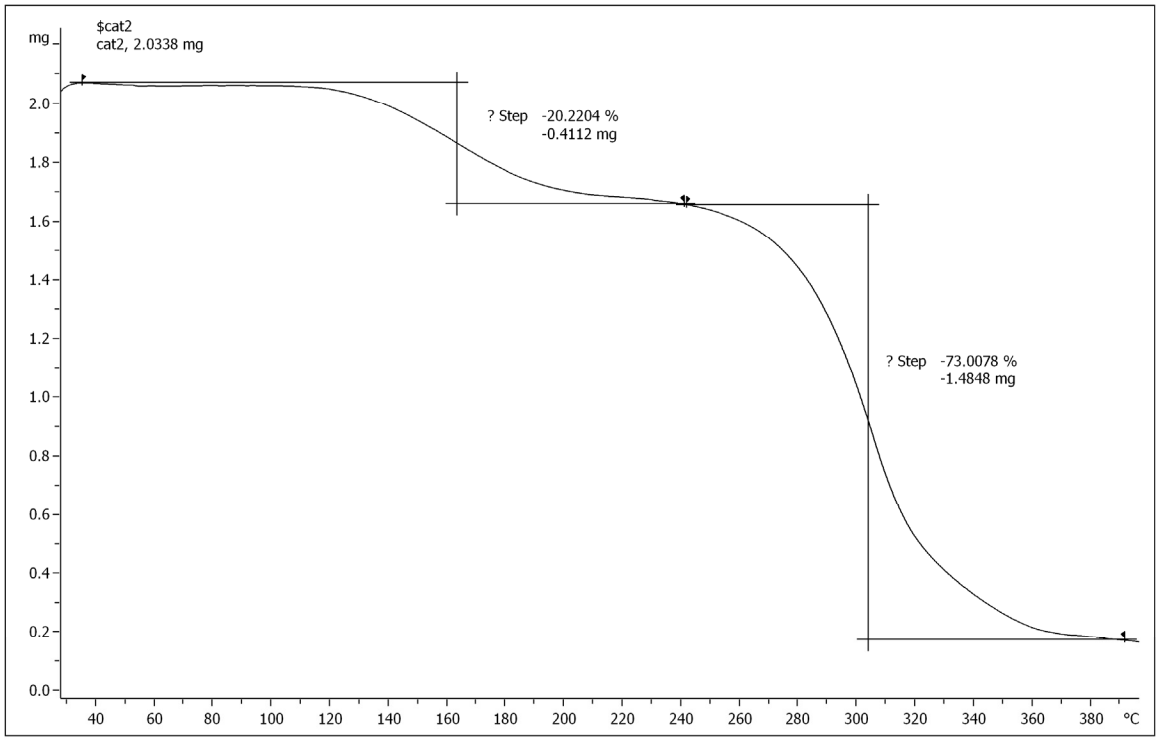


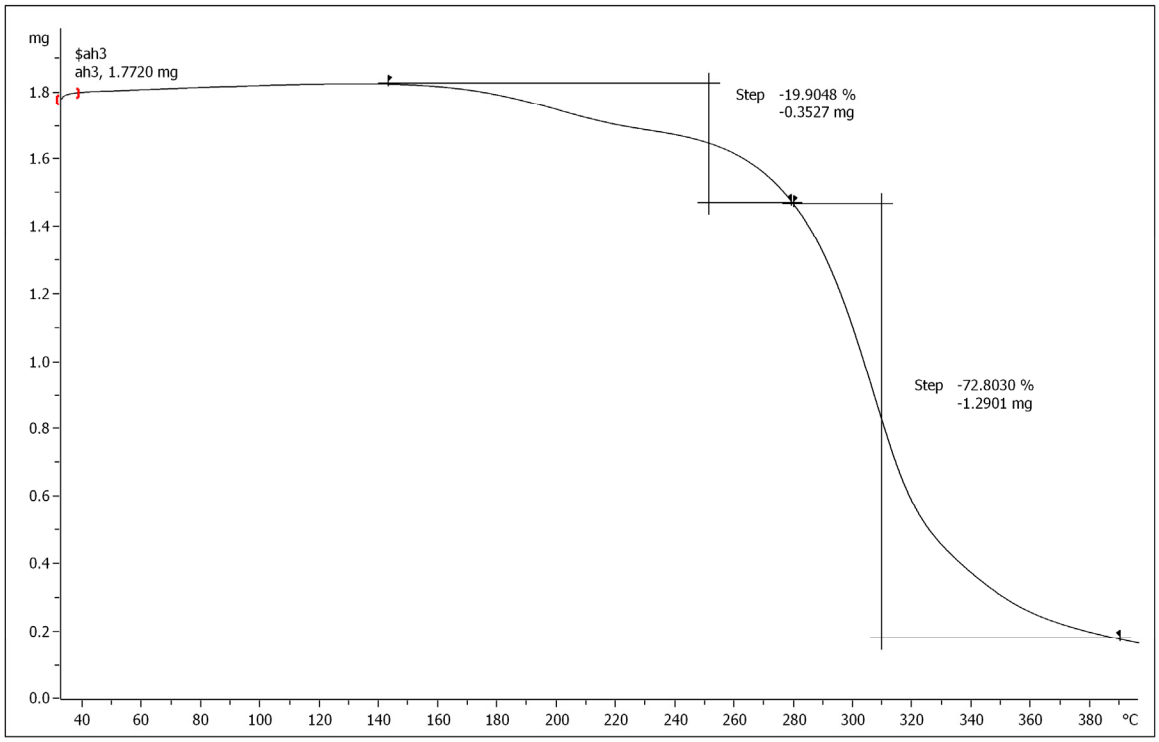
Fig.S2 Comparison of simulated PXRD patterns with experimental PXRD patterns of five cocrystals.


mg
$res1
res1, 3.4140 mg
? Step -19.6577 %
-0.6711 mg
? Step -80.0287 %
-2.7322 mg
°C
METTLER TOLEDO
STARe SW 14.00

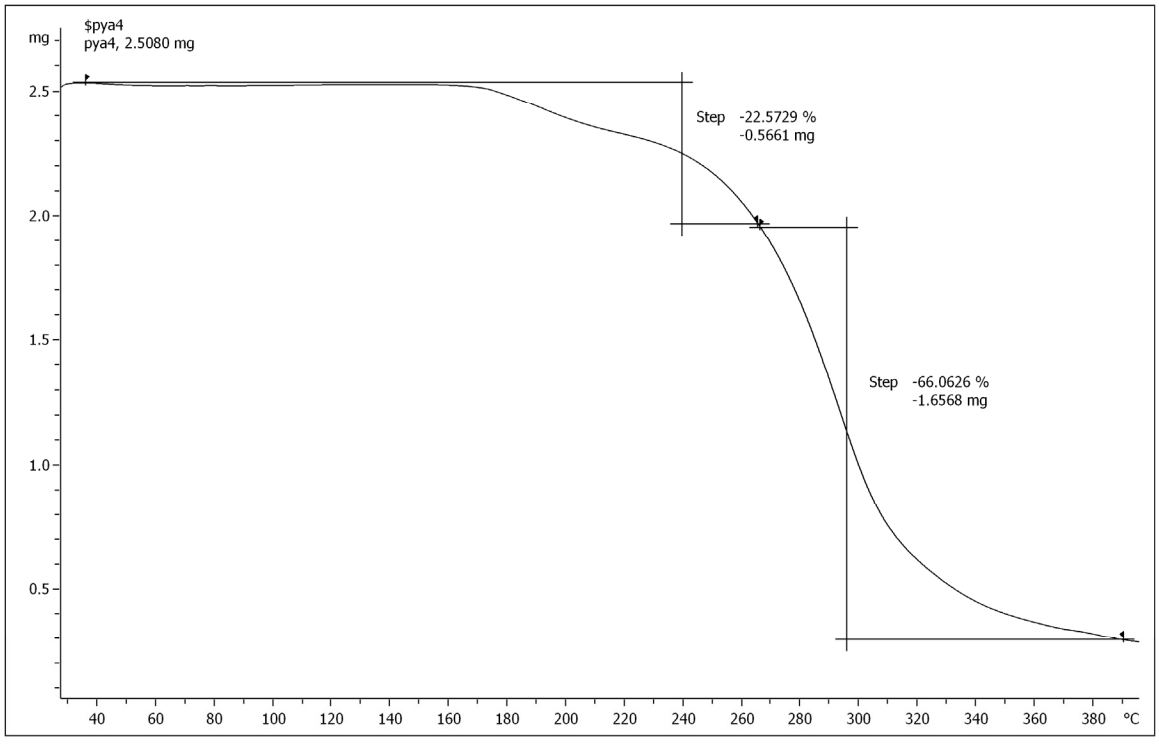
(a)


mg
$cat2
cat2, 2.0338 mg
? Step -20.2204 %
-0.4112 mg
? Step -73.0078 %
-1.4848 mg
°C
METTLER TOLEDO
STARe SW 14.00

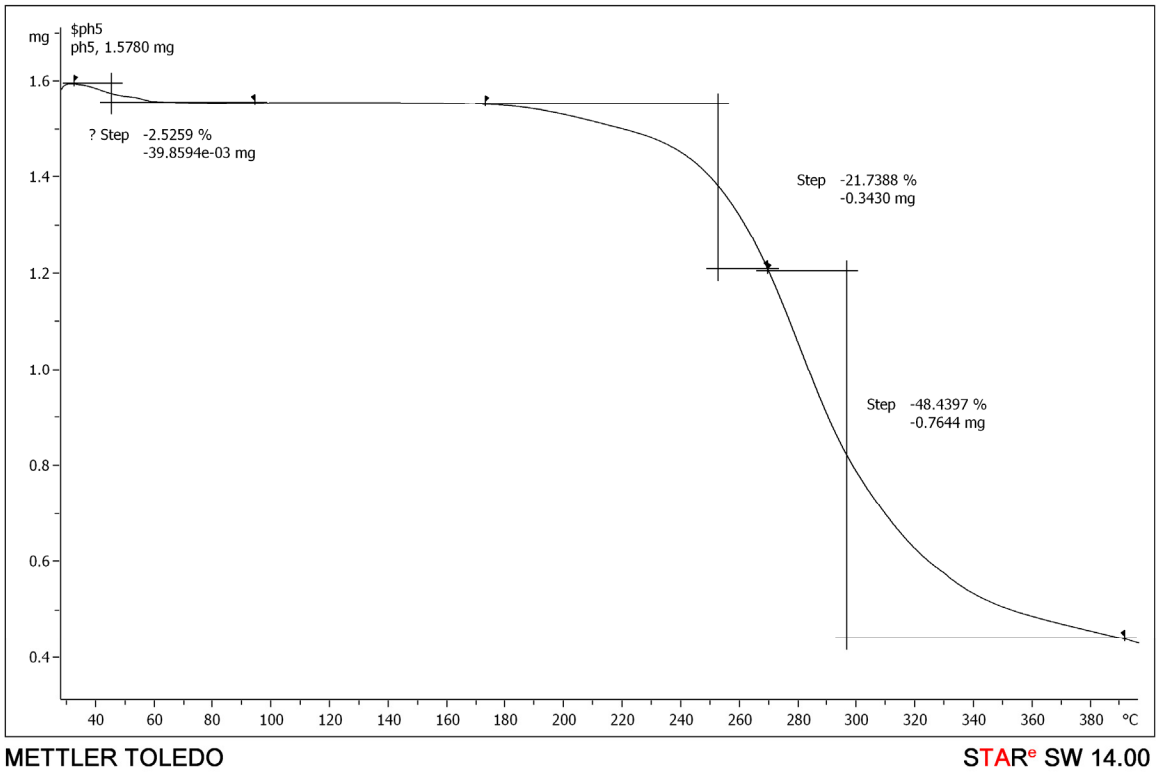
(b)


mg
$ah3
ah3, 1.7720 mg
Step -19.9048 %
-0.3527 mg
Step -72.8030 %
-1.2901 mg
°C
METTLER TOLEDO
STARe SW 14.00

(c)

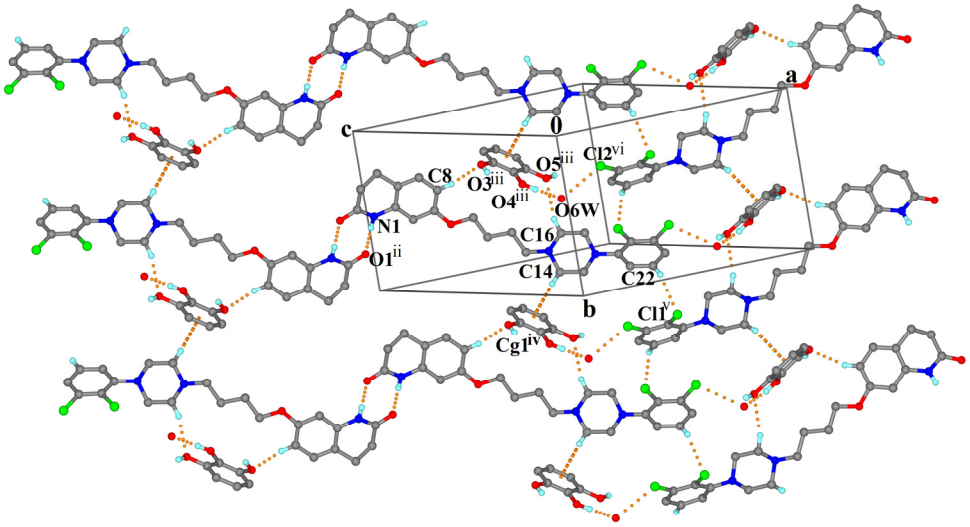

mg
$pya4
pya4, 2.5080 mg
Step -22.5729 %
-0.5661 mg
Step -66.0626 %
-1.6568 mg
°C
METTLER TOLEDO
STARe SW 14.00

(d)

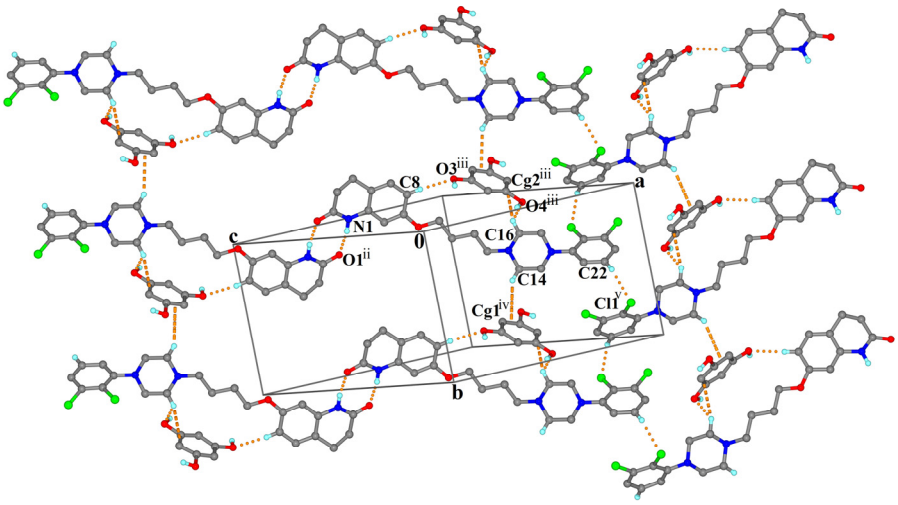


(e)

Fig. S3 (a) Thermo gravimetric curve of cocrystal I. (b) Thermo gravimetric curve of cocrystal II. (c) Thermo gravimetric curve of cocrystal IIII. (d) Thermo gravimetric curve of cocrystal IV. (e) Thermo gravimetric curve of cocrystal V.

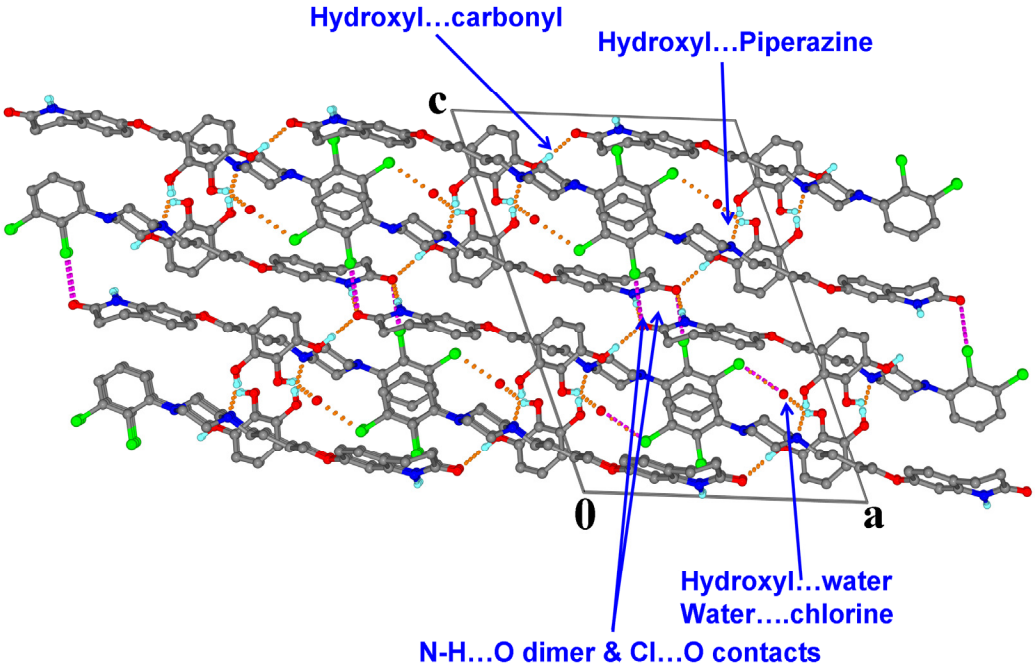


(a)

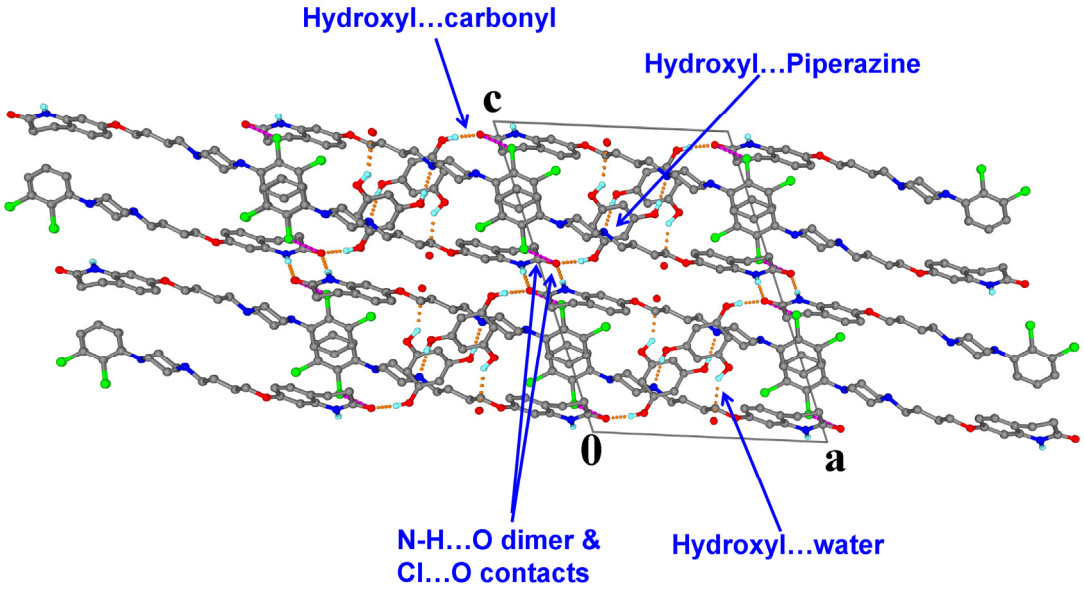


(b)

Fig.S4 (a) Cocrystal IV, extension of centrosymmetric amide N1–H1···O1 dimer into a 2D layered structure by a combination of C14–H14B···Cg1, C8–H8···Cg2, C16–H16A···O5, C8–H8···O3, C22–H22···Cl1, O4–H4O···O5W, Cl2···O6W interactions. Symmetry codes are, [i] -1-x,1/2+y,1/2-z; [ii] -1-x,1-y,1-z; [iii] -x,-1/2+y,1/2-z; [iv] -x,1/2+y,1/2-z; [v] 1-x,1/2+y,1/2-z; [vi] -1+x,y,z; [vi] –x, 1-y, 1-z; Cg1 is centroid of C24-C29 atoms and Cg2 is centroid of C24/C29 atoms. (b) Cocrystal V, extension of centrosymmetric amide N1–H1···O1 dimer into a 2D layered structure by a combination of C14–H14B···Cg1, C16–H16A···Cg2, C17–H17B···O4, C8–H8···O3, C22–H22···Cl1 interactions. Symmetry codes are, [i] -x,1/2+y,1/2-z; [ii] -x,-y,1-z; [iii] 1-x,-1/2+y,1/2-z; [iv] 1-x,1/2+y,1/2-z; [v] 2-x,1/2+y,1/2-z; vi -1+x, -1+y, z; [vii] 1-x, -y, 1-z; Cg1 is the centroid of C28/C29 atoms; Cg2 is of C26/C27 atoms; Cg3 is of C18-C23 atoms.



(a)



(b)

Fig.S5 (a) Cocrystal IV. (b) Cocrystal V. The three dimensional interlayer bonding in two cocrystals mediated through various interactions is shown in the picture.