Really, how significant is hydrogen-bonding in supramolecular association in molecular crystals?

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Molecular packing
- Well known...
  - Hydrogen bonding
  - Halogen bonding
  - "Emerging"
- Secondary bonding
  - M...M interactions
  - M...H interactions
- Interactions involving chelate rings

Tetrel, Pnictogen and Chalcogen Secondary Bonding

Steric effects and secondary bonding

"Hg(S$_2$CN$_2$R$_2$)$_2$"
Sum of the van der Waals radii for Hg and S = 3.35 Å

Aurophilic (Au-Au) interactions

Heterometallophilic (M-M) interactions

Se:O in Ebselen®
polar gap, σ-hole: ~8 kcal/mol

Polymorphs of PhAuC-NPh
(a) to (b) touch of a needle / mechanical grinding
Metal–hydrogen interactions as supramolecular synthons

Pt₆-H-N and Pt₆-H-O hydrogen bonding in trans-[PtCl₂(NH₃)(N-glycine)]

Ni–H interactions in Ni(S₂CNRR)₂

Metal–hydrogen interactions as supramolecular synthons

Architectures sustained by {...HCNM}₂ synthons

Au π(arene) interactions

Polymorphs of (Ph₂PCH₂PPh₂)(AuCl)₂

Intermolecular Au π(arene) interactions

0-D

1-D

up to 12 kcal/mol

Intermolecular M(lp) π(arene) interactions
Intermolecular M(lp) π(arene) interactions

Intermolecular interactions involving chelate rings

Intermolecular interactions involving quasi-chelate rings

Conclusions

More than hydrogen bonding

Energies of "emerging" interactions similar

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