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## Weak intermolecular interactions modulate supramolecular synthon: A combined X-ray powder diffraction and Hirshfeld surface analysis

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Crystal structure of 4-oxo-4*H*-chromene-3-carbaldehyde (**I**) has been investigated from X-ray powder diffraction data along with Hirshfeld surface analysis and associated 2D fingerprint plot. A comparison of intermolecular interaction of related compound shows the contribution of weak intermolecular interactions tuned the supramolecular assembly forming  $C_1^1(5)$ ,  $C_1^1(3)$  polymeric chain and  $R_1^1(8)$ ,  $R_4^4(20)$  rings generating two-dimensional honeycomb framework. Hirshfeld surface analysis of (**I**) and a few related chloro/bromo/iodo derivatives obtained from CSD also shows that moderately weak inter molecular interactions play a significant role in crystal packing arrangement. Additionally, interpretation of Full Interaction Map (FIM) also supports the observed packing arrangement of the title compound.

**Keywords:** *Ab-initio* structure determination, Weak intermolecular interaction, Supramolecular assembly, Hirshfeld surface analysis, HOMO-LUMO gap, Full Interaction Map