Di- to Pentahydrates of Five Alkylenediamines. A Case Study of One- and Two-Dimensional Water Polymers in Solids [1]
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The crystal structures of five low-melting hydrates of \( n \)-alkane-\( \alpha,\omega \)-diamines, \( \text{H}_2\text{N(CH}_2\text{)}_n\text{NH}_2 \cdot x \text{H}_2\text{O} \), for short \( \text{C}_n \cdot x \text{W} \), have been determined. As a common feature, the water molecules are mutually linked by hydrogen bonds \( \text{O-H-}\cdot\cdot\cdot\text{O} \) to form low-dimensional polymers. These are a meandering chain in \( \text{C}_2 \cdot 2 \text{W} \) (space group \( \text{I}2\text{I/a} \), \( Z = 4 \) formula units per unit cell), a zig zag chain in \( \text{C}_6 \cdot 2 \text{W} \) (\( \text{P}2_1\text{c} , Z = 2 \)), a ribbon of consecutively condensed five-membered rings in \( \text{C}_3 \cdot 3 \text{W} \) (\( \text{P}2_1\text{c} , Z = 4 \)) and a layer of condensed and spiro-linked rings of varying size each in \( \text{C}_7 \cdot 3 \text{W} \) (\( \text{P}1\text{, Z = 4} \)) and \( \text{C}_4 \cdot 5 \text{W} \) (\( \text{C}2\text{c} , Z = 4 \)). Further hydrogen bonding, between the water polymers and the bifunctional amine molecules, leads to overall connectivities which are three-dimensional in each structure.

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