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Hydrated nickel(II) ions: The new secondary building units for the formation of 2D and 3D cationic water networks

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As supramolecular assemblies, water molecules may just act as fillers by accommodating the interstitial voids or be a part of the self-assembled architecture themselves. The inter- and intramolecular H-bonds in various water clusters have been found to lie between -9 and -32 kJ mol^{-1} and -10 to -100 kJ mol^{-1} , respectively, and for both, the data invariably depends on the O...O cutoff being considered. Therefore, the major role of understanding water cluster chemistry is played by X-ray crystallography. One of the aims of these structural studies on water clusters has been to accurately characterize them as various structural motifs. We have found that $[\text{Ni}(\text{H}_2\text{O})_6]_{2+}$ has the ability to form self-assembled supramolecular structures with lattice water molecules and demonstrate yet another unique modes of the cooperative association of water molecules, forming 2D and 3D cationic layers of water molecules. The anions are forming either alternate H-bonded layers with the 2D water layers or are sitting in the huge channels present in the open 3D network of water molecules. Such structural studies are helpful in understanding the nature and role of various water clusters in biological systems, where assorted metal ions are involved in diverse biological functions in an aqueous environment.

Biography

Geeta Hundal has done her PhD from Guru Nanak Dev University in the field of Small Molecule Crystallography. She did her Post-doctoral research for two years in the same field at CSIC, Rocasolano, Madrid, Spain and stayed in South Korea for two years as Brain-pool Scientist in the Korean Research Institute of Chemical Technology. She is presently a Professor in the Department of Chemistry, Guru Nanak Dev University, Amritsar, India. She has published 145 research papers in journals of international repute. Besides Crystallography, her other topics of interest are Chemical Sensing, Supramolecular Chemistry and Coordination Chemistry.

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