

Engineering coordination and supramolecular copper-organic networks by aqueous medium self-assembly with 1,3,5-triaza-7-phosphaadamantane (PTA).

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Streszczenie

The aqueous medium self-assembly reactions of copper(II) nitrate with 1,3,5-triaza-7-phosphaadamantane (PTA) as a main ligand and sodium azide or iodide as an auxiliary ligand lead to the new water-soluble Cu(I) coordination polymer $[\text{Cu}(\mu\text{-N}_3)(\mu\text{-PTA})]_n$ (**1**) and monomer $[\text{CuI}(\text{PTA})(\text{PTAH})_2]\text{I}_2\cdot\text{H}_2\text{O}$ (**2**) (PTAH = N-protonated form of PTA), with the PTA cages exhibiting the rare P,N- or the conventional P-coordination mode, respectively. Another hydrosoluble P-bound PTA derivative $[\text{Cu}(\text{PTA})_4](\text{NO}_3)\cdot 6\text{H}_2\text{O}$ (**3**) is furnished in the absence of any auxiliary ligand. The compounds have been characterized by IR and NMR spectroscopy, elemental and single crystal X-ray diffraction analyses which feature the formation of a unique one-dimensional (1D) coordination network in **1** composed of the $\{\text{Cu}_2(\mu\text{-N}_3)_2\}$ cores and PTA spacers, as well as 1D (in **2**) and three-dimensional (3D) (in **3**) supramolecular structures built from multiple N-H...N (PTAH/PTA) and O-H...N ($\text{H}_2\text{O}/\text{PTA}$) H-bonds, respectively. The study broadens the still limited use of PTA as a spacer or building block for crystal engineering of metal-organic coordination and supramolecular networks, their nature being also dependent on the type of auxiliary ligand. Compound **1** represents the first example of a copper coordination polymer with PTA.

Adres publiczny

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<https://www.acs.org/content/acs/en.html>