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Two silver(I) tetrachlorophthalates incorporating aminopyrimidyl ligands, namely [Ag\textsubscript{4}(apym)\textsubscript{4}(tcpta)\textsubscript{2}]\textsubscript{n} (1) and [Ag\textsubscript{2}(dmapym)(tcpta)]\textsubscript{n} (2), (apym = 2-aminopyrimidine, dmapym = 2-amino-4,6-dimethylpyrimidine, H\textsubscript{2}tcpta = tetrachlorophthalic acid), were synthesized and characterized by elemental analysis, IR spectroscopy and single-crystal X-ray diffraction. Both 1 and 2 form sheets which are assembled into 3D supramolecular frameworks \textit{via} halogen bonds, hydrogen bonds and \(\pi\cdots\pi\) interactions. Even adding two more methyl groups to the pyrimidyl ring does not change the dimensions of 1 and 2, but it influences the arrangement of the \(N\)- and \(O\)-donors in the solid state which in turn results in different types of halogen bonds. The photoluminescence properties of 1 and 2 were investigated in the solid state at room temperature.

\textit{Key words:} Silver(I), 2-Aminopyrimidine, Tetrachlorophthalic Acid, Halogen Bonds, Photoluminescence