The reaction of the 4-hydroxy-pyridine-2,6-dicarboxylic acid (for short H$_2$hyppyc) and 2-aminopyrimidine (for short 2-apym) with vanadium(V) and iron(III) chlorides in distilled water medium produces prism brown crystals of (2-apymH)[VO$_2$(hyppyc)$_2$].H$_2$O (1) and near colorless crystals of (2-apymH)[Fe(hyppyc)$_2$] (2), respectively. Both crystal structures were thoroughly characterized by CHN elemen analyses, FTIR spectroscopy, TGA, and SXRD methods. 1 and 2 crystallize in the space group P$ar{2}_1$ of the monoclinic and Pbcn of orthorhombic systems, where the final R values for 1 and 2 are 0.0012 for 3641 reflections collected and 0.0015 for 5016 reflections collected, respectively. The unit cell dimensions for 1 are a = 5.3875(4) Å, b = 7.9518(5) Å, c = 13.8489(9) Å and $\alpha$ = 90.9210(10)$^\circ$, 94.4130(10)$^\circ$, y = 90.3460(10)$^\circ$ and for 2 are a = 7.8679(3) Å, b = 16.0020(6) Å, c = 30.0965(11) Å. The VO$_2^+$ group is coordinated by two oxygen and one nitrogen atoms of the (hyppyc)$_2^-$ ligand and Fe(II) atom is coordinated by four oxygen and two nitrogen atoms of (hyppyc)$_2^-$ ligand. The coordination geometry around V$^{IV}$ and Fe$^{III}$ centres are distorted trigonal bipyramidal and distorted octahedral respectively.

Reference