A Rare Two-dimensional Network Based on 2,2'-Biimidazole Bridged Double [PW$_{11}$O$_{39}$Ni]$^{5-}$ Polyanions

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A novel two-dimensional complex based on the mono-vacant Keggin anion [PW$_{11}$O$_{39}$]$^{7-}$, [Ni(BIIM)$_3$]$_3$ [{Ni(BIIM)$_2$}$_2$(PNiW$_{11}$O$_{39}$)$_2$(BIIM)]$^2$H$_2$O (BIIM = 2,2'-biimidazole), was hydrothermally synthesized and characterized by elemental and thermo-gravimetric analysis, IR and UV spectroscopy. Each [PW$_{11}$O$_{39}$]$^{7-}$ anion captures an Ni$^{2+}$ ion forming a [PNiW$_{11}$O$_{39}$]$^{5-}$ polyanion, two of which are linked together by a BIIM ligand into a [(PNiW$_{11}$O$_{39}$)$_2$(BIIM)]$^{10-}$ polyanion supporting two Ni(BIIM)$_2$$^{2+}$ units through two terminal oxygen atoms and affording a complicated [{Ni(BIIM)$_2$}$_2$(PNiW$_{11}$O$_{39}$)$_2$(BIIM)]$^{6-}$ heteropolyanion. Each of these units is further attached to four surrounding equivalent units by their own Ni(BIIM)$_2$$^{2+}$ linkers into a two-dimensional brick wall-like network with (6,3) topology.

Key words: Polyoxometalate, Crystal Structure, Keggin, Topology