Non-Covalent Interactions in a Dinuclear M$_2$L$_2$ Metallocycle

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Abstract: The combination of the square-planar cis-protected [Pt(ddpp)(O$_2$SCF)$_3$] with the ditopic N,N'-Bis-(3,5-dimethyl-4-pyridinyl)-4-ethoxy-2,6-pyridinedicarboxamide ligand, leads to a quantitative self-assembled M$_2$L$_2$ metallocycle$^1$.

Main text: Supramolecular chemistry relies on non-covalent interactions, which can be of different nature$^2$. The understanding and utilization of all non-covalent interactions is of fundamental importance for the further development of inorganic supramolecular chemistry and prediction of crystal structures. Recently it is accepted that anion-pi interactions are attractive non-covalent interactions if electron-deficient aromatics are present$^3$. Ligands with pyridine groups or nitrogen heterocycles in general are used as building blocks in the design of metal-ligand networks (Scheme 1).

\[ \text{Scheme 1} \]

Pyridine, hyrazine and other aromatic nitrogen heterocycles are known as electron poor ring systems. A metal with is coordinated to a nitrogen heteroatom will further enhance the electron withdrawing effect through its positive charge.

Aromatic nitrogen heterocycles should in principle be well suited for pi-pi interactions because of their low pi-electron density. Searches of the CSD for aryl-C-H–anion contacts between substituted benzene rings and common anions reveal that such interactions are very common in solid state.

References: