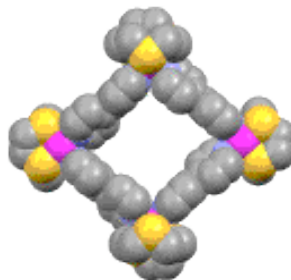


# Rhodium(III) Molecular Squares formed by Transition Metal Mediated Self-Assembly

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The ability to design porous, but crystalline solids could have important applications in areas such as the removal of atmospheric carbon dioxide and the storage of strategic gases like hydrogen and methane. Molecular squares are a class of molecules used for these purposes. The squares are prepared from subunits via a self-assembly process where a transition metal “directs” the formation of the supramolecular structure. We have recently reported the preparation of a novel molecular square whose structure is shown above. The four corners are comprised by platinum(II) ions, each coordinated by one capping macrocyclic sulfur ligand, and bridged by four diimine bipyridines. Interestingly, over half of the atoms in the square are in a state of flux. One can clearly see the central cavity of the square in the space-filling structure. We recently have observed an equilibrium between this square and a related molecular triangle.



In the Summer of 2010, we will continue to prepare new molecular squares via the self-assembly process. We will look using complexes containing the metal ion rhodium(III) as the corners of the squares. Thioether complexes of Rh(III) are redox active exhibiting both Rh(I) as well as a rate Rh(II) oxidation states.  $^1\text{H}$  and  $^{13}\text{C}$  NMR will be critical in verifying the formation of the molecular squares. Other characterization tools include cyclic voltammetry, ultraviolet-visible spectroscopy, and FT-IR. Collaborations with Dr. Don VanDerveer at Clemson provide the opportunity to do complete structural characterizations by single crystal X-ray diffraction. The student is encouraged to present their research findings professional chemistry meetings. Several good choices in 2010/11 include the Southeastern Regional Meeting of the American Chemical Society which will be held in the Fall of 2010 in New Orleans, Pacificchem held in December of 2010 in Honolulu or in the Spring of 2011 at the ACS National Meeting of the ACS which will be held in Anaheim. Provost Student Research Awards (given by the University) are a potential funding source available to students to cover their travel expenses involved for these meetings.