

## Ruthenium(II) 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 at the bottom of the page. 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.

In the Summer of 2009, we will continue to prepare new molecular squares via the self-assembly process. We will look using complexes containing the metal ion ruthenium(II) as the corners of the squares. Ru(II) is redox active, and its complexes also find use in photochemical applications. Both  $^1\text{H}$  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. Two good choices in 2009/2010 are the Southeastern Regional Meeting of the American Chemical Society which will be held in the Fall of 2009 in San Juan, Puerto Rico or in the Spring of 2010 at the ACS National Meeting of the ACS which will be held in San Francisco. 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.

