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Assembly of Niobium Polyoxometalates and Azamacrocycles

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Poster Presentation P48

ASSEMBLY OF NIOBIUM POLYOXOMETALATES AND AZAMACROCYCLES

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Dr. Roesner's research group has been investigating interactions between azamacrocycles and polyoxometalates with the long-term goal of using polyoxometallates to direct the assembly of those macrocycles into supramolecular species. Initially, the group focused on Keggin polyoxoanions (e.g. $\text{PW}_{12}\text{O}_{40}^{3-}$, $\text{SiW}_{12}\text{O}_{40}^{4-}$), which are stable only in acidic solution. The azamacrocycles are partially or fully protonated over this pH range and the resulting polyoxoanion/macrocycle adducts exhibit properties consistent with their strong ionic bonding. Most of the salts composed of macrocyclic cations and polyoxoanions are poorly soluble in both water and polar organic solvents. In an effort to develop more-soluble polyoxoanion/adducts, the hexaniobate ion, $\text{Nb}_6\text{O}_{19}^{8-}$, was synthesized. This niobium polyoxometallate is stable at high pH and can therefore coexist in solution with neutral (free base) azamacrocycles. To date, no host guest complexes between the hexaniobate ion and free base azamacrocycles have been isolated.