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## Formation of Macrocycles Involving the Hexamolybdate Ion

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FORMATION OF MACROCYCLES INVOLVING  
THE HEXAMOLYBDATE ION

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Polyoxometalates are anionic metal-oxygen clusters of the groups V and VI transition metals in their highest oxidation states. These anions have large, symmetrical structures, and are known for a myriad of interesting and useful properties including catalytic activity, redox properties, applications in supramolecular chemistry, and anti-viral and anti-tumoral behaviors.

My research with polyoxometalates has focused on the synthesis of macrocyclic rings consisting of a diamine and the hexamolybdate ion  $[\text{Mo}_6\text{O}_{19}]^{2-}$  (Figure 1, Product 2). Work so far has involved synthesizing tetrabutylammonium hexamolybdate, synthesizing aryl diamines of varying carbon chain lengths, and reacting the hexamolybdate ion with different aryl diamines under varying reaction conditions. These reactions are carried out in an inert atmosphere environment and usually run for between 3-7 days.

A major obstacle in the synthesis of a macrocycle involving hexamolybdate is controlling the reaction so the hexamolybdate ion reacts with the diamine in the desired stoichiometric ratio and with the desired connectivity.  $^1\text{H}$  NMR spectra and FAB mass spectra show that only trace amounts of the macrocyclic ring are being formed in these reactions. The more prevalent products have structures that include a dumbbell shaped molecule consisting of two hexamolybdates attached on either end of a long organic chain (Figure 1, Product 1) and a monosubstituted organoimido hexamolybdate (Figure 1, Product 3).

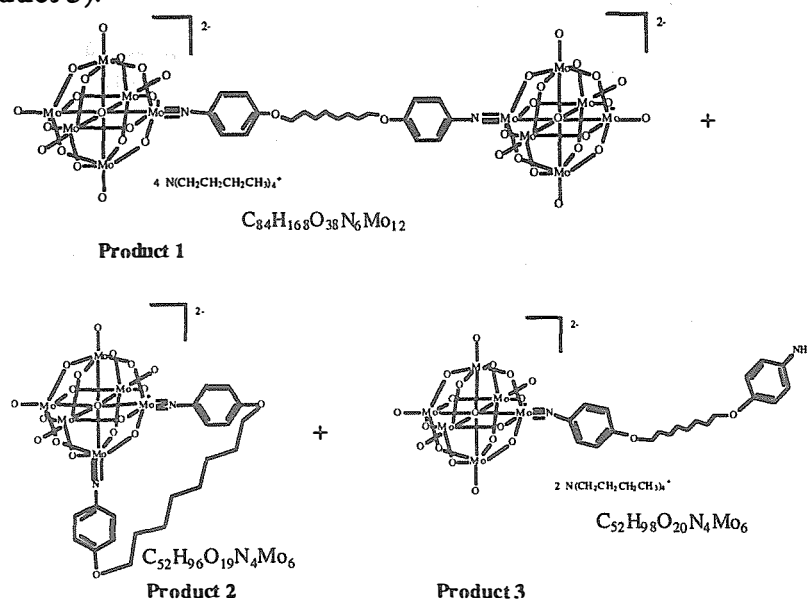


Figure 1: Some observed products of the reaction of the hexamolybdate ion with aryl diamines.