



Illinois Wesleyan University
Digital Commons @ IWU

John Wesley Powell Student Research
Conference

2000, 11th Annual JWP Conference

Apr 15th, 2:00 PM - 3:00 PM

Attaching Organic Ligands to the Keggin Ion

Jacqui Hoffman
Illinois Wesleyan University

Rebecca Roesner, Faculty Advisor
Illinois Wesleyan University

Follow this and additional works at: <https://digitalcommons.iwu.edu/jwprc>

Hoffman, Jacqui and Roesner, Faculty Advisor, Rebecca, "Attaching Organic Ligands to the Keggin Ion" (2000). *John Wesley Powell Student Research Conference*. 21.
<https://digitalcommons.iwu.edu/jwprc/2000/posters2/21>

This Event is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact digitalcommons@iwu.edu.

©Copyright is owned by the author of this document.

Poster Presentation 18

ATTACHING ORGANIC LIGANDS TO THE KEGGIN ION

Jacqui Hoffman and Rebecca Roesner*

Department of Chemistry, Illinois Wesleyan University

Polyoxometalates are early transition metal-oxygen cluster compounds. Such complexes are known to be valuable catalysts, analytical reagents, and electron microscopy stains. Another potentially important application of heteropoly species is in clinical medicine. Several polytungstates have significant antiviral and antitumoral activity. The Keggin anion, $\text{XM}_{12}\text{O}_{40}^{n-}$, shown in figure 1, is among the most biologically active polyoxometalates.

By attaching organic molecules to the surface of this cluster, it may be possible to

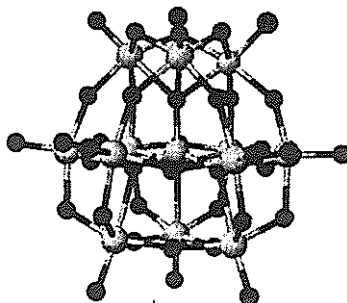


Figure 1

develop drugs which "seek out" diseased cells. Before this can be accomplished, however, fundamental techniques for forming polyoxometalate-carbon bonds must be developed.

The first molecule that we synthesized was a lacunary Keggin ion. A lacunary ion has one W-O group missing resulting in a vacancy in an otherwise symmetric molecule. The structure was confirmed by ^{31}P NMR, FT-IR and UV analysis. A carboxylate functional group was then attached to the lacunary ion by inserting a rhodium atom bearing a $-\text{CH}_2\text{COOH}$ ligand. The color change from white to orange (indicative of rhodium) signified successful substitution of the vacancy. The product was analyzed by ^1H NMR and FT-IR. A ^{31}P NMR spectrum was also obtained which showed the expected chemical shift. In the next and final step, we attempted to convert the carboxylate group to an amide through an anhydride intermediate.