Polyoxometalate Chemistry: From Topology Via Self Assembly To Applications

Polyoxometalates (POMs) are a class of inorganic compounds that have been studied extensively for their unique structural and chemical properties. They are composed of metal-oxo clusters that are typically surrounded by a shell of oxygen atoms. POMs have a wide range of applications, including catalysis, materials science, and medicine.

Polyoxometalate Chemistry From Topology via Self-Assembly to Applications by W. Todd Abernathy

4.2 out of 5

Language	: English
File size	: 10660 KB
Text-to-Speech	: Enabled
Print length	: 434 pages
Screen Reader	: Supported
X-Ray for textbooks	: Enabled

Structure of POMs

POMs are typically composed of a central metal atom or cluster that is surrounded by a shell of oxygen atoms. The metal atoms are typically in a high oxidation state, and the oxygen atoms are typically in a bridging position between two metal atoms. The resulting structure is often a highly symmetrical, cage-like molecule.

The structure of POMs can be described using a variety of topological tools. One common approach is to use the Keggin structure, which is a polyhedron with 12 vertices and 20 edges. The Keggin structure is often used to describe POMs with a central metal atom that is surrounded by a shell of 12 oxygen atoms.

Self-Assembly of POMs

POMs can self-assemble into a variety of different structures, depending on the conditions under which they are formed. One common self-assembly process is the formation of micelles. Micelles are spherical structures that are composed of a core of POMs that is surrounded by a shell of water molecules.

The self-assembly of POMs can be controlled by a variety of factors, including the pH, temperature, and concentration of the solution. By controlling these factors, it is possible to create POMs with a variety of different structures and properties.

Applications of POMs

POMs have a wide range of applications, including catalysis, materials science, and medicine.

- **Catalysis**: POMs are used as catalysts in a variety of reactions, including the oxidation of organic compounds, the reduction of metal ions, and the polymerization of monomers.
- **Materials science**: POMs are used in the synthesis of a variety of materials, including ceramics, glasses, and semiconductors.

- **Medicine**: POMs are used in the treatment of a variety of diseases, including cancer, diabetes, and arthritis.

Polyoxometalates are a versatile class of compounds with a wide range of applications. Their unique structural and chemical properties make them ideal for use in catalysis, materials science, and medicine.

The field of POM chemistry is still in its early stages, and there is much that we do not yet understand about these fascinating compounds. However, the research that has been done to date has shown that POMs have the potential to revolutionize a wide range of fields.

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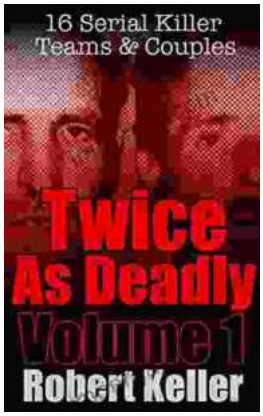

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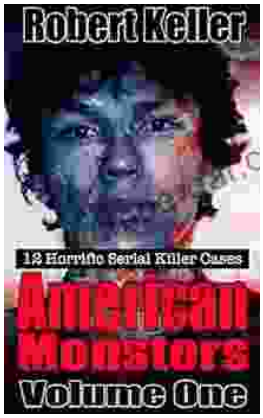

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