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***Course Name: Chemistry of d-and f-
block elements***

Paper Number – 201

Section –B

Topic: poly-oxo metallates of Ru, Os, Mo

Number of Classes: Two (01)

Module: 1

HISTORY

- Polyoxometalates (POMs) are known since the beginning of the 19th century as it is generally admitted that the first species of this class (the ammonium salt of phosphomolybdic acid $\text{H}_3\text{PMo}_{12}\text{O}_{40}$) was discovered by Berzelius in 1826 ("molybdenum blues").
- The first structural determination of the phosphotungstic anion $[\text{PW}_{12}\text{O}_{40}]^{3-}$ was done by Keggin in 1933.
- Polyoxometalates as a kind of typical inorganic cluster exhibit various structural and functional properties that other general inorganic compounds do not possess.

- Polyoxometalates are negatively charged aggregates of transition metals.
- Mainly Vanadium, Molybdenum and Tungsten with oxygen.
- More precisely, they are typically composed of metal ions in their highest oxidation state bridged by oxo ligands (O^{2-}).
- Almost any other element can be incorporated into the POM framework, and this leads to an overwhelming diversity of structures and properties.

POMs contain a fairly large number of atoms in a relatively compact, three-dimensional structure.

- A hexacoordinated metal is represented by an octahedron and a tetracoordinated metal by a tetrahedron.
- In condensed structures with bridging ligands, the polyhedra share vertices and edges, or more rarely faces.
- Figure 1 (NEXT PAGE) gives an example for the representations of *alpha*-[Mo₈O₂₆]⁴⁻.

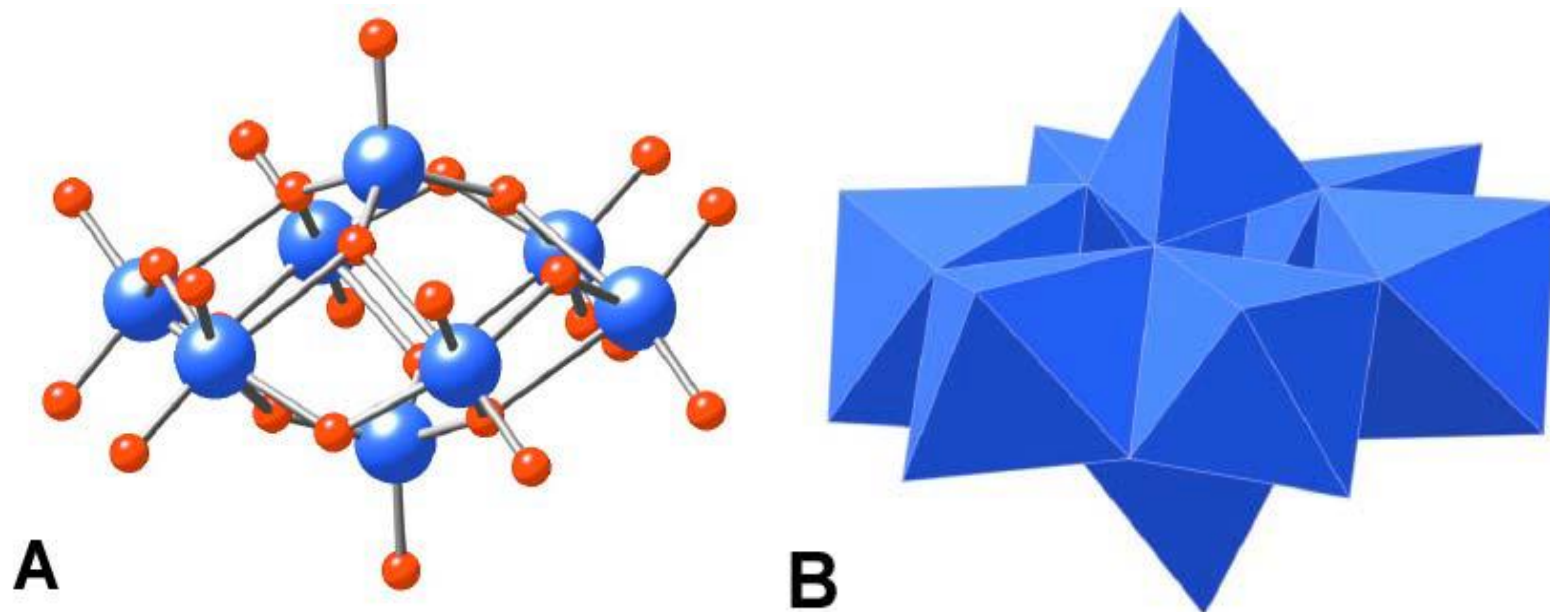


Figure 1. Structure drawings of α -[Mo₈O₂₆]⁴⁻. A) Ball and-Stick representation. B) Polyhedral representation.

More information can be obtained at

<http://www.chem.gla.ac.uk/cronin/media/papers/273.HutinComplnorgChem.pdf>

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