Course Instructor: Dr. Sasanka Deka

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: 2

Continuation from module 1

- One can divide the family of POMs in several groups depending on their composition and structure.
- POMs of the general formula $[M_mO_y]^{n-}$ containing only a transition metal and oxygen are called isopolyoxometalates.
- Compounds including a small number of additional elements $[X_xM_mO_y]^{n-}$ (X = heteroelement, x smaller than m) belong to the sub-class of hetero-polyoxometalates.

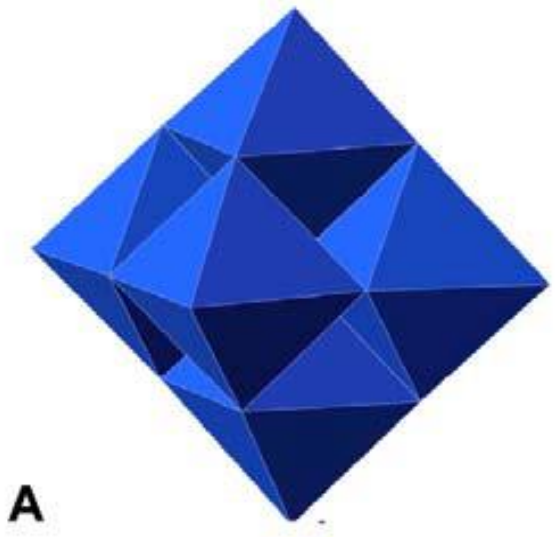
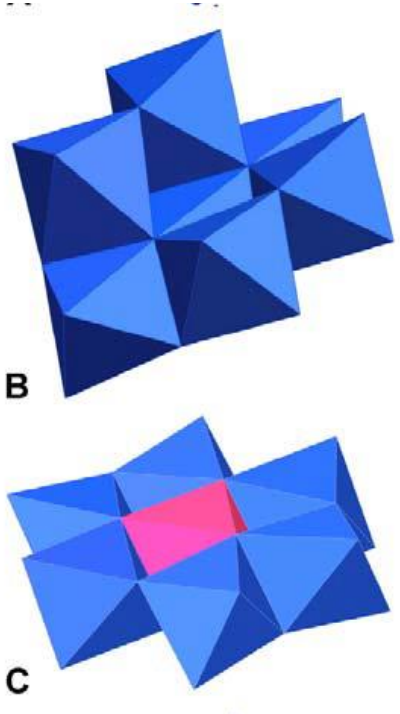


Figure 2A. Polyhedral representations of some common polyoxometalate structures. $[M_6O_{19}]^{n-}$ (Lindqvist-structure).

- Among the different structures known for POMs, some are more common and are shown in Figure 2.
- The Lindqvist structure (Figure 2A) is adopted by hexametalates of the formula $[M_6O_{19}]^{n-}$.

Figure 2 (B,C). Polyhedral representations of some common polyoxometalate structures. B) $[Mo_7O_{24}]^{6-}$, C) $[XM_6O_{24}]^{n-}$ (Anderson-structure).



- The structures in Figure 2b and c exemplify the structural diversity of compounds with the same general formula [M7O24]n–.
- The bent structure in Figure 2b is adopted by the isopolymolybdate [Mo7O24]6– the so called paramolybdate.
- Heteropolyoxometalates [XM6O24]n– present the Anderson structure depicted in Figure 2c.

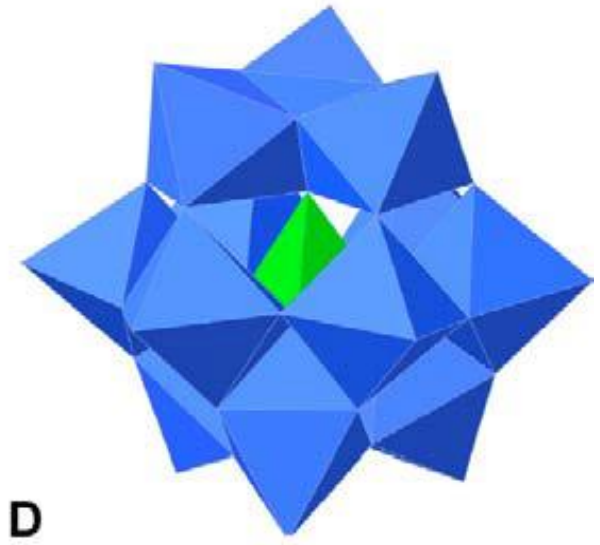


Figure 2. Polyhedral representations of some common polyoxometalate structures. D) $[XM_{12}O_{40}]^{n-}$ (Keggin-structure),

- The most common structure with tetrahedrally coordinated heteroatoms is the Keggin ion of general formula $[XM_{12}O_{40}]^{n-}$ (Figure 2D).

More information can be obtained at
http://www.chem.gla.ac.uk/cronin/media/papers/273.HutinCompInorgChem.pdf
Frontiers in Bioscience 10, 275--287, January 1, 2005