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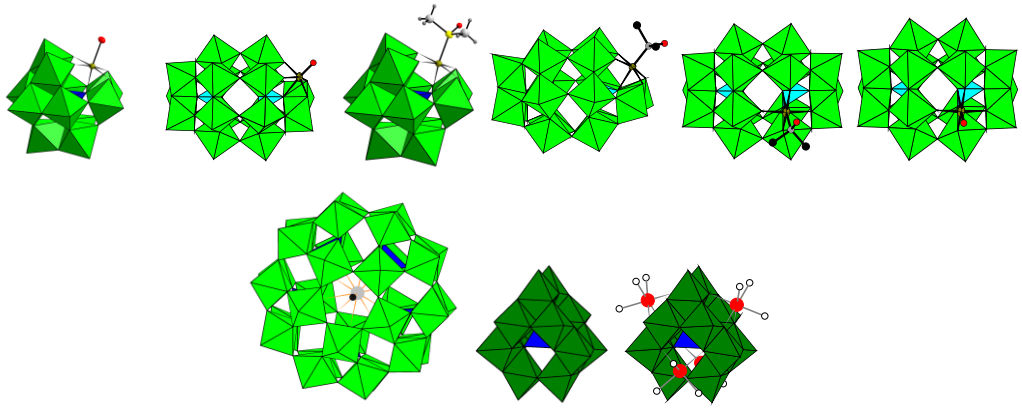
Research keyword: Ruthenium containing POM; Preyssler-type POM; ε-Keggin based metal oxide; High-resolution ESI-MS; Water oxidation catalyst; Porous Materials.

Ruthenium containing POM. We investigate methods to prepare mono-Ru substituted heteropolytungstates such as $[XW_{11}O_{39}Ru(H_2O)]^{n-}$ (X = P, Si, or Ge) and α_1- or α_2-$[P_2W_{17}O_{39}Ru(H_2O)]^{7-}$, and their derivatives [1]. These show multi-electron redox properties and are active oxidation catalysts for several reaction including water oxidation.

Preyssler-type POM. We found that acid property of Preyssler-type heteropolyacid, $H_{15-n}[P_5W_{30}O_{110}M^{n+}]$ is higher than that of Keggin-type phosphotungstic acid. We investigate synthesis of new Preyssler-type derivatives [2].

ε-Keggin based metal oxide. We are interested in synthesis of porous all inorganic molybdenum oxides by connecting epsilon-Keggin heteropolymolybdate and application as adsorption materials and catalysts [3].

High-resolution ESI-MS. We use high-resolution ESI-MS with an accuracy of 3 ppm [1,2,4]. We can measure your samples.



[1] a) *Dalton Trans*. **2016**, *45*, 3715. b) *Inorg. Chem*. **2014**, *53*, 3526. [2] a) *ACS Omega*, **2018**, *3*, 2363. b) *Inorg. Chem*. **2016**, *55*, 11583. [3] a) *Inorg. Chem*. **2017**, *56*, 2043. b) *Inorg. Chem*. **2014**, *53*, 7309. [4] a) *Eur. J. Inorg. Chem*. **2019**, ??. b) *Inorg. Chem*. **2017**, *56*, 8759. c) *Inorg. Chem*. **2016**,

55, 8292.