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Developing new low-cost and efficient proton-conducting materials remains an attractive and challenging task. Polyoxometalates are a type of nanosized redox-active molecules with either rich proton source or other exchangeable cations such as  $\text{Li}^+$ ,  $\text{Na}^+$ ,  $\text{K}^+$ . We designed and synthesised a series of polyoxometalate-based proton conducting materials. The structure was characterized by single crystal X-ray diffraction, PXRD, FT-IR, TG, solid-state NMR, SEM, TEM and etc. We studied the relationship between the crystal structure and proton conduction of compounds, and studied kinetic process of proton transfer. We have even combined polyoxometalate clusters with polymer matrix to make hybrid membranes which may potentially be used in proton-exchange membrane fuel cells or other energy conversion devices.

**Possible Collaborations:** Sayaka Uchida, Masahiro Sadakane, Carsten Streb, Ryo Tsunashima

**Reference:**

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