

**Type of Position:** PhD (TV-L13, 67%), FSU Jena, Germany

**Research Area:** Polymer Chemistry

**Principle Investigator (PI):** Prof. Dr. Felix H. Schacher

**Name of Institute:** Institute of Organic Chemistry and Macromolecular Chemistry  
Friedrich-Schiller-University Jena (FSU), Germany

**TRR234-B3: "POMbranes" – Incorporation of catalytically active polyoxometalates into integral asymmetric block copolymer membranes** (Leopold, **Schacher**, Streb)

The project will focus on mechanistic understanding of molecule-in-membrane reactivity, develop membrane-in-reactor integration concepts and use advanced *in situ/operando* analytical methods to understand light-driven hydrogen evolution reaction, water oxidation catalysis and alcohol oxidation activity of membrane-embedded photosensitizer and catalyst. POMbrane reactivity when integrated into flow photoreactors will be studied spatially and temporally resolved under *in situ/operando* conditions. Factors affecting component and matrix stability as well as reactivity will be evaluated using experimental and theoretical analysis. Finally, chemical approaches allowing stabilization, regulation and repair of POMbranes will be worked on.

**Short description of the Job:** In close collaboration with synthetic inorganic and analytical chemistry, polymer membranes incorporating polyoxometalates as catalysts (POMbranes) will be synthesized. This involves controlled / living polymerization techniques, surface and polymer modification, and coupling strategies. Different strategies will be pursued to attach catalysts (POMs) and/or photosensitizers to polymer membranes, followed by investigation of stability (leaching) and light-driven catalytic activity. The overall goal is to achieve long-lasting and highly active novel heterogeneous matrix/catalyst combinations for water splitting or alcohol oxidation. Another important aspect is to develop these systems to enable use in tailor-made photo-flow reactors developed together with technical chemistry.

She/he should be highly motivated to work in an interdisciplinary and international team and should have excellent written and oral communications skills in English.