Heterometallic Uranyl Alkoxides: Revisiting the Non-Aqueous Uranyl Chemistry

Dennis Grödler, Aida Raauf, Andreas Lichtenberg, Jennifer Leduc, Markus Zegke and Sanjay Mathur*
Inorganic and Materials Chemistry, University of Cologne, Germany.
sanjay.mathur@uni-koeln.de

ABSTRACT: We have revisited non-aqueous uranyl chemistry and hereby present the first heterometallic uranyl alkoxides with lanthanides and transition metals by reactions with $\text{UO}_2(\text{OAc})_2$ and the corresponding silylamides of the metals $\text{M}^{x+}[\text{N}\{\text{Si}(\text{CH}_3)_3\}_2]_x$ ($\text{M} = \text{Ln, Zr}$) in the presence of tert-butanol. The Zr containing compound $[\text{Zr}_2\text{UO}_2(\text{OtBu})_8(\text{OAc})_2]$ can be described as a trinuclear core chain, while the lanthanides lead to a planar triangle $[\text{Ln}_2\text{UO}_2(\text{OtBu})_7(\text{OAc})_2]$ forming dimers by acetate bridging. In terms of application, $\text{UZrO}_4$ nanoparticles were obtained by microwave assisted decomposition of $[\text{Zr}_2\text{UO}_2(\text{OtBu})_8(\text{OAc})_2]$ and $[\text{Ln}_2\text{UO}_2(\text{OtBu})_7(\text{OAc})_2]$ was analyzed via electron spin resonance (EPR) with regard to single molecule magnets.

References: