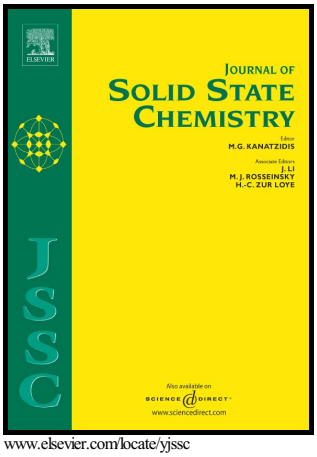

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Rare Earth Niobate Coordination Polymers

Collin N. Muniz,[1,2] Hiral Patel,[2] Dylan B. Fast,[1] Lauren E. S. Rohwer,[3] Eric W. Reinheimer,[4] Michelle Dolgos,[1] Matt W. Graham,[2] May Nyman[1*]
[1]Department of Chemistry & [2]Department of Physics, Oregon State University, Corvallis, OR 97331, USA
[3]Microsystem Integration Department, Sandia National Laboratories, Albuquerque, NM 87185, USA
[4]Rigaku Oxford Diffraction, 9009 New Trails Drive, The Woodlands, TX 77381, USA
*corresponding author: may.nyman@oregonstate.edu; http://nyman.chem.oregonstate.edu/

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ABSTRACT

Rare-earth (RE) coordination polymers are infinitely tailorable to yield luminescent materials for various applications. Here we described the synthesis of a heterometallic rare-earth coordination compound **$((CH_3)_2SO)_3(RE)NbO(C_2O_4)_3$ ($(CH_3)_2SO$) = dimethylsulfoxide, DMSO), (C_2O_2 = oxalate), (RE=La, Ce, Pr, Nd, Sm, Eu, Gd, Tb).** The structure was obtained from single crystal X-ray diffraction of the La analogue. The Nb=O and DMSO terminal-bonding character guides assembly of an open framework structure with noncentrosymmetric RE-coordination geometry, and large spacing between the RE centers. A second structure was observed by PXRD for the smaller rare earths (Dy, Ho, Er, Yb); this structure has not yet been determined. The materials were further characterized using FTIR, and photoluminescence measurements. Characteristic excitation and emission transitions were observed for RE = Nd, Sm, Eu, and Tb. Quantum yield (QY) measurements were performed by exciting Eu and Tb analoges at 394 nm (QY 66%) and 464 nm (QY 71%) for Eu; and 370 nm (QY=40%) for Tb. We attribute the high QY and bright luminescence to two main structure-function properties of the system; namely the absence of water in the structure, and absence of concentration quenching.