

## **NEW LANTANUM TANTALATE PHASES INVESTIGATED BY HIGH TEMPERATURE XRD AND HIGH RESOLUTION POWDER DIFFRACTION**

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Rare Earth niobates and tantalates have been investigated for their ionic conductivity, photocatalysis, and luminescence properties. Typically these materials are fabricated at high temperatures via solid-state syntheses of the oxide powders. We have employed an aqueous route to rare earth tantalates to synthesize new Lanthanum tantalate compounds from Lanthanum acetate and alkali salts of Linqvist ion polyoxotantalates. The synthesis yielded the new compound  $\text{La}_2\text{Ta}_2\text{O}_7(\text{OH})_2$  which was successfully derived by Structure-Determination-from-Powder-Data (SDPD). High temperature XRD of the  $\text{La}_2\text{Ta}_2\text{O}_7(\text{OH})_2$  compound indicated transformation to an intermediate  $\text{LaTaO}_4$  phase at  $\sim 800^\circ\text{C}$  prior to the formation of  $\text{LaTaO}_4$  at approximately  $1200^\circ\text{C}$ . Isolation and high resolution XRD analysis of the intermediate phase yielded the structure of the intermediate compound. These results and subsequent luminescence properties will be reported. High resolution XRD patterns were collected using beamline 11-BM at the Advanced Photon Source (Argonne National Laboratory).

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