

Abstract Submitted
for the SES17 Meeting of
The American Physical Society

Synthesis of Ruddlesden-Popper Strontium Iridate Epitaxial Thin Films PEYTON NANNEY, JUNYI YANG, JIAN LIU, University of Tennessee Knoxville — We investigated the growth conditions conducive to synthesize Ruddlesden-Popper type SrIrO_3 , Sr_2IrO_4 , and $\text{Sr}_3\text{Ir}_2\text{O}_7$ epitaxial thin films via pulsed laser deposition (PLD). Many factors influence the thermodynamic interactions of the deposition and therefore, determines the material phase that is created. Through a systematic review of these growth conditions, we constructed a growth phase diagram that maps out conditions that enable stable formation of strontium iridate phases. We synthesized these phases with a single Sr_2IrO_4 target and by varying the O_2 chamber pressure and the substrate temperature. These films allow for the analysis of magnetic properties of the material through vibrating sample magnetometry (VSM) and other methods. Our findings demonstrate the control of the thermodynamic stability of different epitaxial layered structure of the complex Ruddlesden-Popper family.

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Date submitted: 06 Oct 2017

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