

Growth and Characterization of 2D Transition Metal Dichalcogenides

Ar reaction transfer $MoCl_5 + S \rightarrow MoS_2$ diffusion $MoCl_5 + S \rightarrow MoS_2$ precipitation Growth of MoS₂ films by CVD using MoCl₅ precursor pioneered by Linyou Cao of Thrust 5. [Yu *et al.*, *Sci. Rep. 3, 1866 (2013)*]

- Chemical Vapor Deposition
- Atomic Force Microscopy
- Raman spectroscopy

Scope of effort

Keys features

- •Wafer-scale growth of single- & few-layer MX₂ films (M=Mo,W; X=S,Se,Te)
- •Characterize number of layers in the MoS₂ films by Raman spectroscopy.
- •Collaborate with other PIs in Thrust 4 to manipulate and reduce defects in the films.

Challenges to address

• Extend the growth of single- & few-layer MoS₂ films to other 2D transition metal dichalcogenides of interest

• Growth of 2D transition metal dichalcogenide films and heterostructures suggested by the theoretical efforts in the EFRC/CCDM.