

Figure 1: Grazing incidence XRD pattern (top) from a WS<sub>2</sub> thin film deposited by low pressure CVD using [(WSeCl<sub>4</sub>)<sub>2</sub>(<sup>i</sup>PrS(CH<sub>2</sub>)<sub>2</sub>S<sup>i</sup>Pr)] at 700 °C. The broad feature at 2θ = 20 -25 ° is from the SiO<sub>2</sub> substrate, XRD pattern for bulk WS<sub>2</sub> (bottom). Run 1.

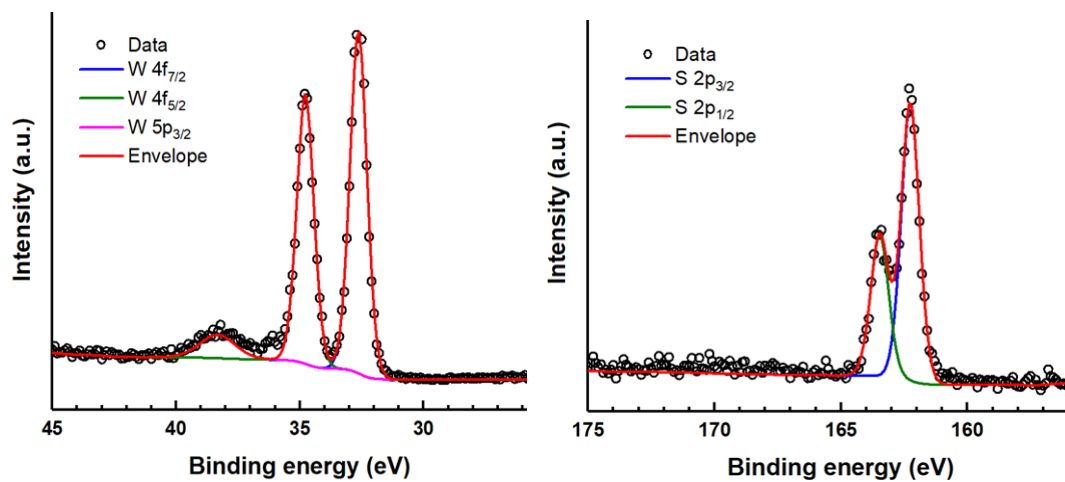


Figure 2: Representative XPS data for an as-deposited WS<sub>2</sub> film thin film via low pressure CVD using [(WSeCl<sub>4</sub>)<sub>2</sub>(<sup>i</sup>PrS(CH<sub>2</sub>)<sub>2</sub>S<sup>i</sup>Pr)]. Showing the peaks associated with tungsten (left) and sulfur (right). Run1.

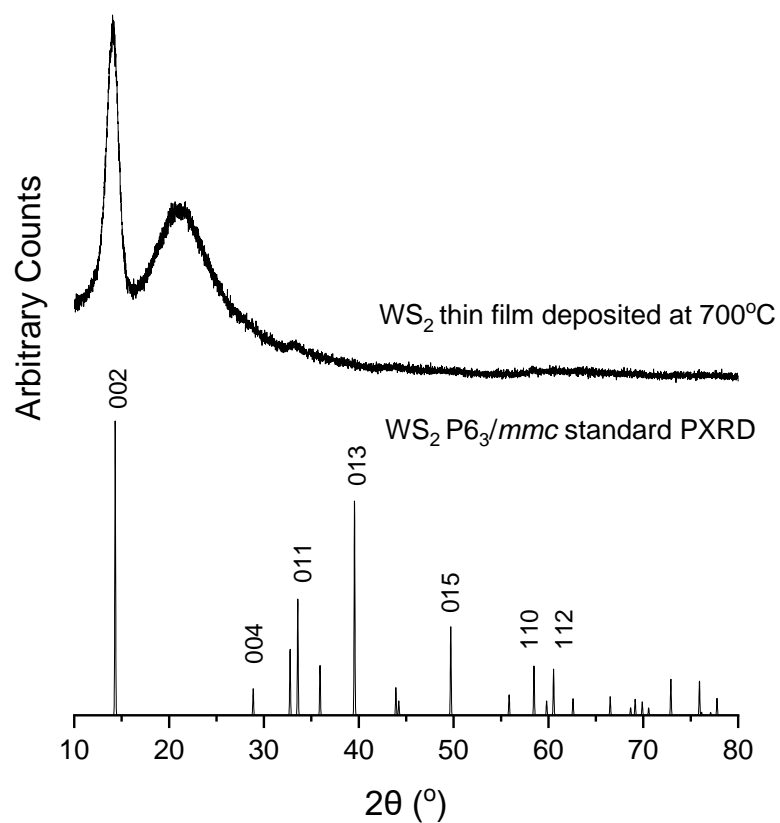


Figure 3: Grazing incidence XRD pattern (top) from a WS<sub>2</sub> thin film deposited by low pressure CVD using [(WScI<sub>4</sub>)<sub>2</sub>(<sup>i</sup>PrS(CH<sub>2</sub>)<sub>2</sub>S<sup>i</sup>Pr)] at 700 °C. The broad feature at 2θ = 20 -25° is from the SiO<sub>2</sub> substrate, XRD pattern for bulk WS<sub>2</sub> (bottom). Run 2.

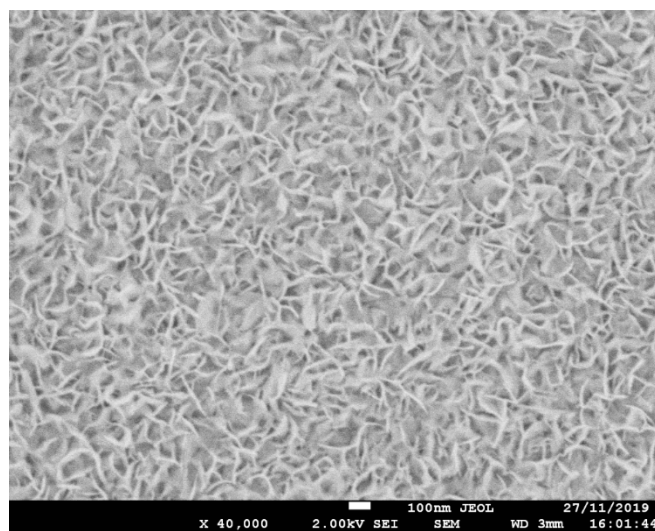
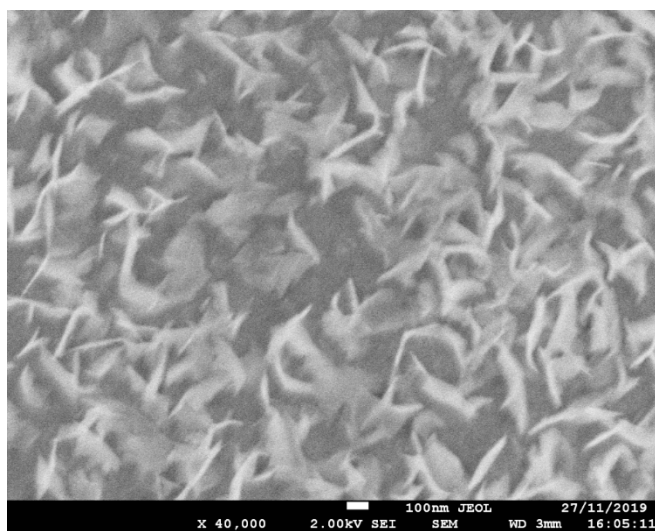


Figure 4: SEM image showing a continuous WS<sub>2</sub> thin film produced via low pressure CVD using [(WScI<sub>4</sub>)<sub>2</sub>(<sup>i</sup>PrS(CH<sub>2</sub>)<sub>2</sub>S<sup>i</sup>Pr)] at 700 °C. Run 2.

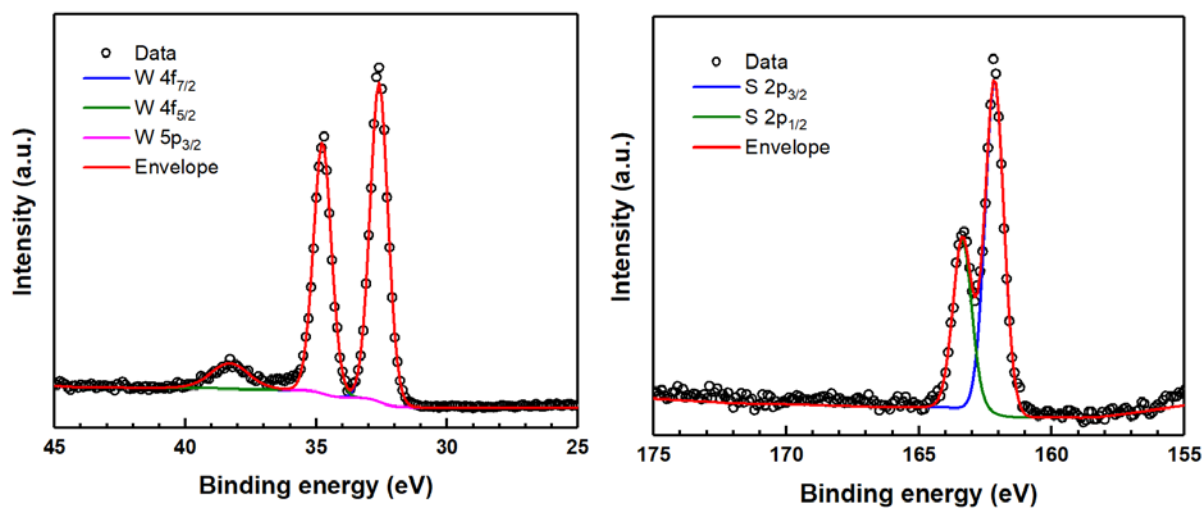


Figure 5: Representative XPS data for an as-deposited  $WS_2$  thin film via low pressure CVD using  $[(WCl_4)_2(iPrS(CH_2)_2SiPr)]$ . Showing the peaks associated with tungsten (left) and sulfur (right). Run 2.

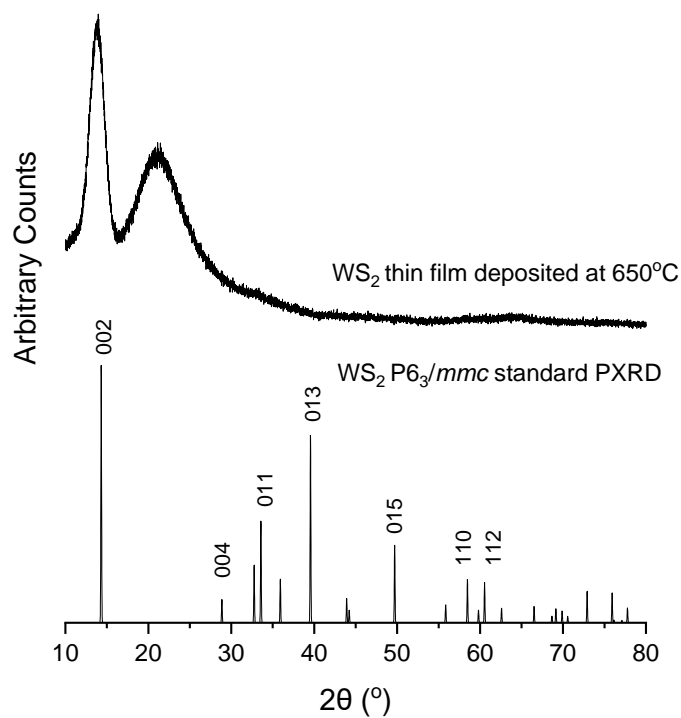


Figure 6: Grazing incidence XRD pattern (top) from a  $WS_2$  thin film deposited by low pressure CVD using  $[(WCl_4)_2(iPrS(CH_2)_2SiPr)]$  at 650 °C. The broad feature at  $2\theta = 20-25^\circ$  is from the  $SiO_2$  substrate, XRD pattern for bulk  $WS_2$  (bottom). Run 3.

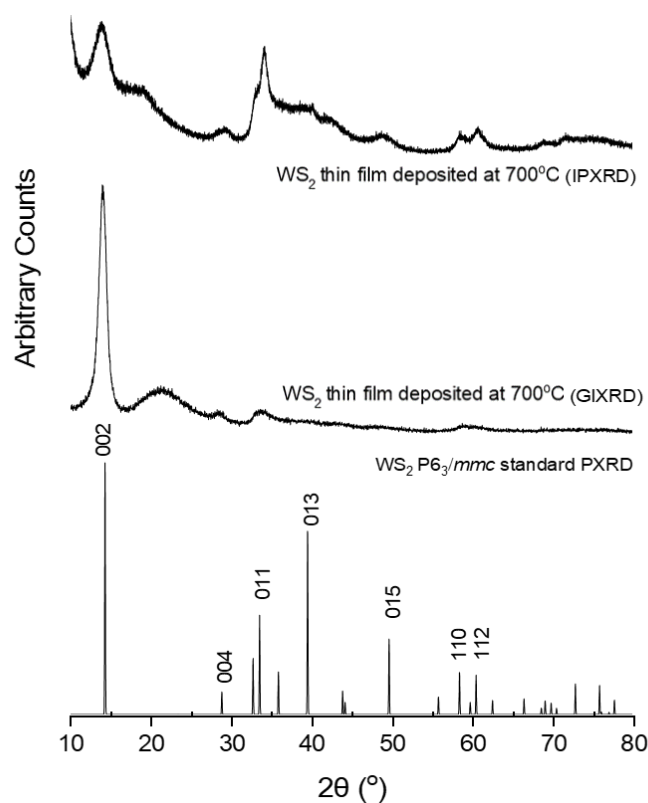


Figure.7: In-plane XRD pattern (top), grazing incidence XRD pattern (middle) from a  $\text{WS}_2$  thin film deposited by low pressure CVD using  $[\text{WScI}_4(\text{S}^n\text{Bu}_2)]$  at  $700^\circ\text{C}$ . The broad feature at  $2\theta = 20-25^\circ$  is from the  $\text{SiO}_2$  substrate, XRD pattern for bulk  $\text{WS}_2$  (bottom). Run 4.

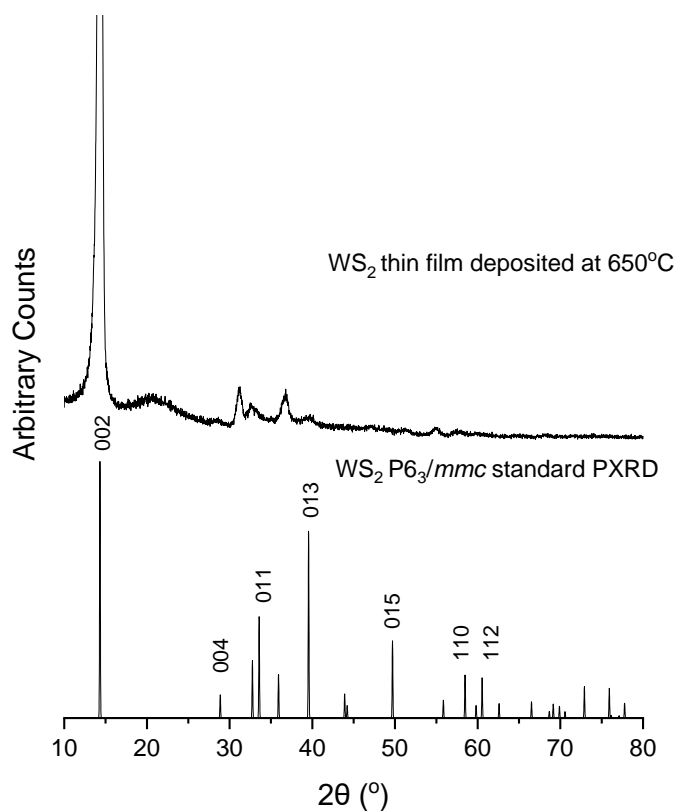


Figure.8: Grazing incidence XRD pattern (top) from a  $\text{WS}_2$  thin film deposited by low pressure CVD using  $[\text{WScI}_4(\text{S}^n\text{Bu}_2)]$  at  $650^\circ\text{C}$ . The broad feature at  $2\theta = 20-25^\circ$  is from the  $\text{SiO}_2$  substrate, XRD pattern for bulk  $\text{WS}_2$  (bottom). Run 5.

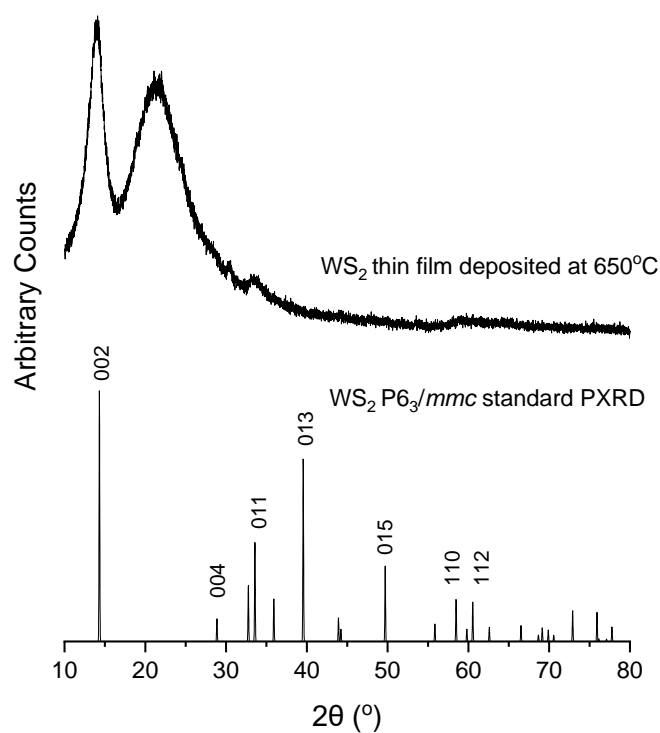


Figure.9: Grazing incidence XRD pattern (top) from a  $\text{WS}_2$  thin film deposited by low pressure CVD using  $[\text{WSCl}_4(\text{S}^n\text{Bu}_2)]$  at  $650^\circ\text{C}$ . The broad feature at  $2\theta = 20-25^\circ$  is from the  $\text{SiO}_2$  substrate, XRD pattern for bulk  $\text{WS}_2$  (bottom). Run 6.

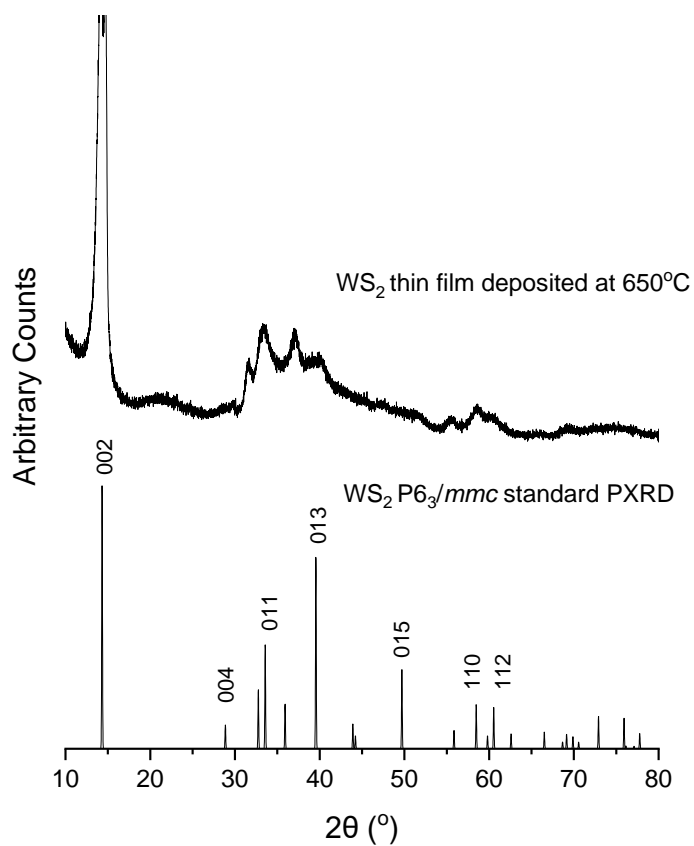


Figure.10: Grazing incidence XRD pattern (top) from a  $\text{WS}_2$  thin film deposited by low pressure CVD using  $[\text{WSCl}_4(\text{S}^n\text{Bu}_2)]$  at  $650^\circ\text{C}$ . The broad feature at  $2\theta = 20-25^\circ$  is from the  $\text{SiO}_2$  substrate, XRD pattern for bulk  $\text{WS}_2$  (bottom). Run 7.