



## Synthesis of WS<sub>2</sub> crystals by the chemical vapor deposition (CVD) method on a SiO<sub>2</sub> substrate

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The synthesis and characterization of WS<sub>2</sub> single crystals grown by chemical vapor deposition (CVD) method thru sulfurization of tungsten oxide thin layer on quartz substrate was studied. Synthesis of WS<sub>2</sub> was carried out at 800-1000 °C in CVD system. The sulphur vapor is transported by argon gas (500 sccm). Obtained WS<sub>2</sub> single crystals characterized by optical microscope, Raman and photoluminescence analysis. Optical microscope analysis demonstrated that triangular WS<sub>2</sub> domains with single phase crystal structure are formed. The thickness of WS<sub>2</sub> is 6 layers, which determined by Raman spectroscopy. Photoluminescence spectroscopy is shown on Fig. 20, which revealed a strong peak between 600-660 nm, typically for a monolayer WS<sub>2</sub> crystal, where the band gap is equal to 1.96 eV.

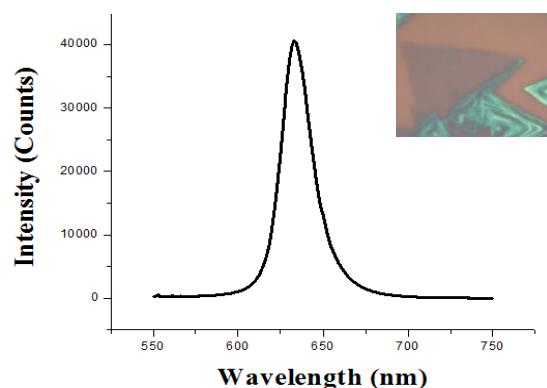


Fig. 20 – Photoluminescence spectrum for produced WS<sub>2</sub> single crystals.

