

1. Full Area Coverage Monolayer WSe₂ on c-cut Sapphire ([Product code: MLWSe2FullSapp](#))


This product contains full area coverage WSe₂ monolayers on c-cut sapphire substrates. Sample size measures 1cm in size and the entire sample surface contains monolayer thick WSe₂ sheet. Synthesized full area coverage monolayer WSe₂ is highly luminescent and Raman spectroscopy studies also confirm the monolayer thickness (please see the technical specifications)

Sample Properties.

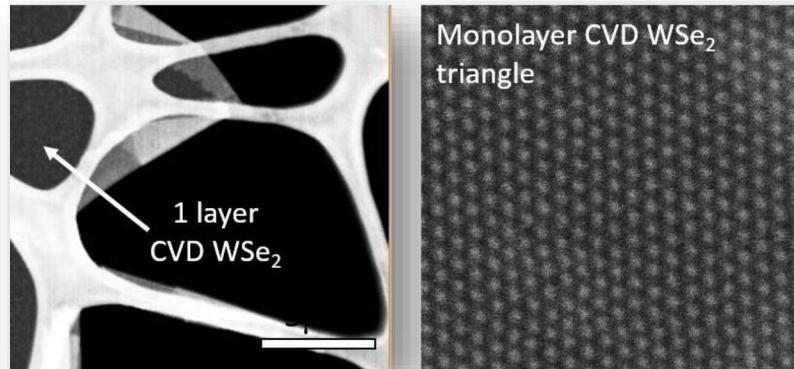
Sample size	1cm x 1cm square shaped
Substrate type	(0001) c-cut sapphire
Coverage	Full coverage monolayer
Electrical properties	1.62 eV Direct Bandgap Semiconductor
Crystal structure	Hexagonal Phase
Unit cell parameters	a = b = 0.327 nm, c = 1.295 nm, $\alpha = \beta = 90^\circ$, $\gamma = 120^\circ$
Production method	Low pressure Chemical Vapor Deposition (LPCVD)
Characterization methods	Raman, photoluminescence, TEM, EDS

Specifications.

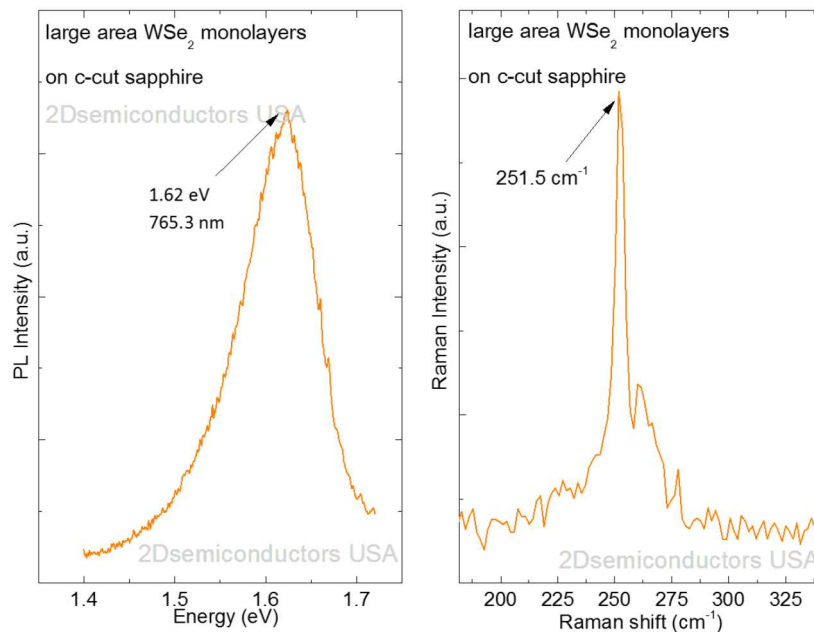
- **Identification.** Full coverage 100% monolayer WSe₂ uniformly covered across c-cut sapphire
- **Physical dimensions.** one centimeter in size. Larger sizes up to 2-inch wafer-scale available upon requests.
- **Smoothness.** Atomically smooth surface with roughness < 0.15 nm.
- **Uniformity.** Highly uniform surface morphology. WSe₂ monolayers uniformly cover across the sample.
- **Purity.** 99.9995% purity as determined by nano-SIMS measurements
- **Reliability.** Repeatable Raman and photoluminescence response
- **Crystallinity.** High crystalline quality, Raman response, and photoluminescence emission comparable to single crystalline monolayer flakes.
- **Substrate.** c-cut Sapphire but our research and development team can transfer WSe₂ monolayers onto variety of substrates including PET, quartz, and SiO₂/Si without significant compromisation of material quality.
- **Support.** 2Dsemiconductors USA is an American owned, regulated, and operated company. Our customers are well-protected by international as well as strict American customer laws and regulations. We give full technical support and guarantee your satisfaction with our well-established customer


Defect profile. WSe₂ monolayers do not contain intentional dopants or defects. However, our technical staff can produce defected WSe₂ using α -bombardment technique.

Supporting datasets [Full area coverage monolayer WSe₂ on c-cut Sapphire ([Product code: MLWSe2FullSapp](#))]



Transmission electron images (TEM) acquired from CVD grown full area coverage WSe₂ monolayers on c-cut sapphire confirming highly crystalline nature of monolayers



Room temperature photoluminescence spectroscopy (PL) and Raman spectroscopy (Raman) measurements performed on CVD grown full area coverage monolayer WSe₂ on c-cut sapphire. Raman spectroscopy measurement confirm monolayer nature of the CVD grown samples and PL spectrum display sharp and bright PL peak located at 1.67 eV in agreement with the literature.