



Article

Continuous-Wave Pumped Monolayer WS₂ Lasing for Photonic Barcoding

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Supplementary Information for

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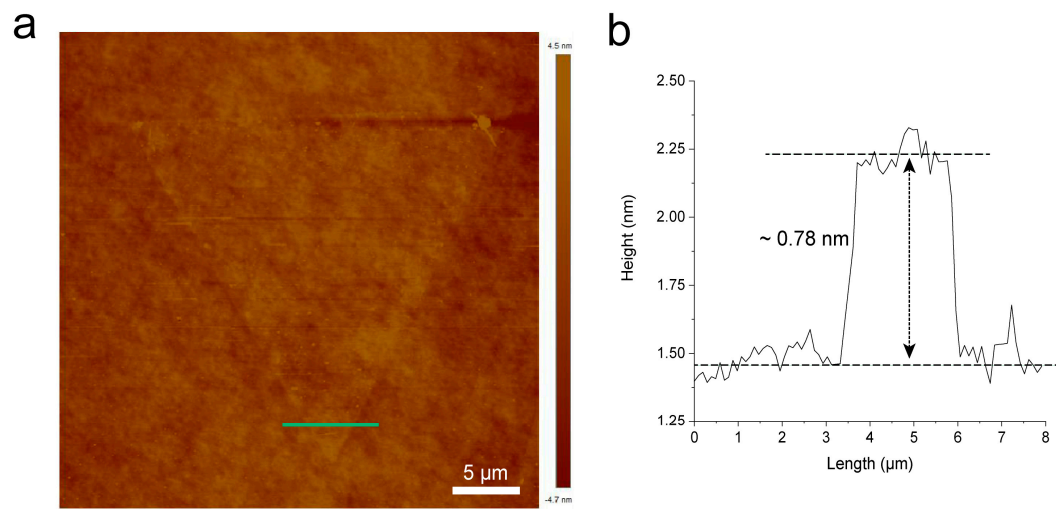


Figure S1. (a) AFM image of a monolayer CVD-grown WS₂. (b) The height profile curve along the solid green line in (a). The thickness of as-grown monolayer WS₂ is about 0.78 nm.

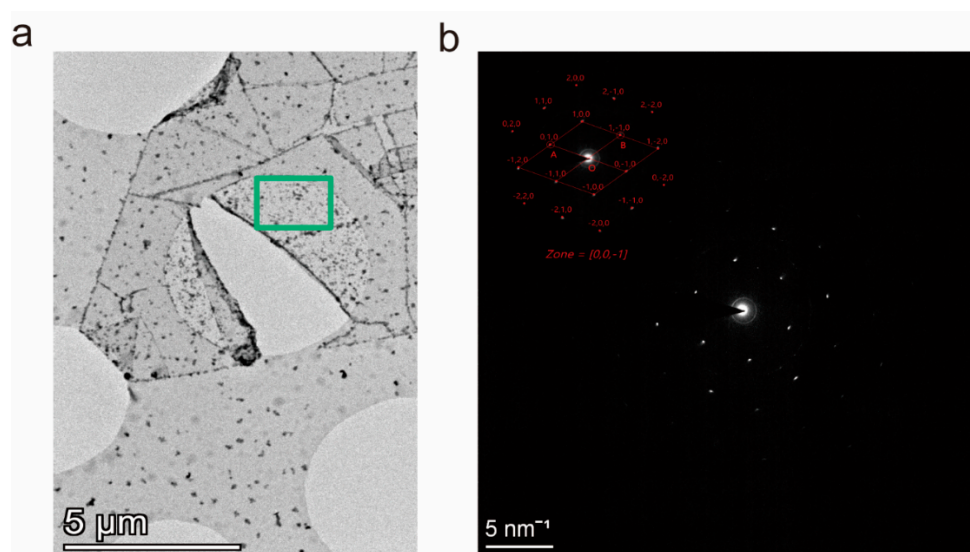


Figure S2. (a) A low-magnification TEM image of the triangular WS₂ monolayer transferred onto Cu grids. (b) SAED pattern of the WS₂ at the location of the green box in (a). Inset: calibration of the SAED pattern.

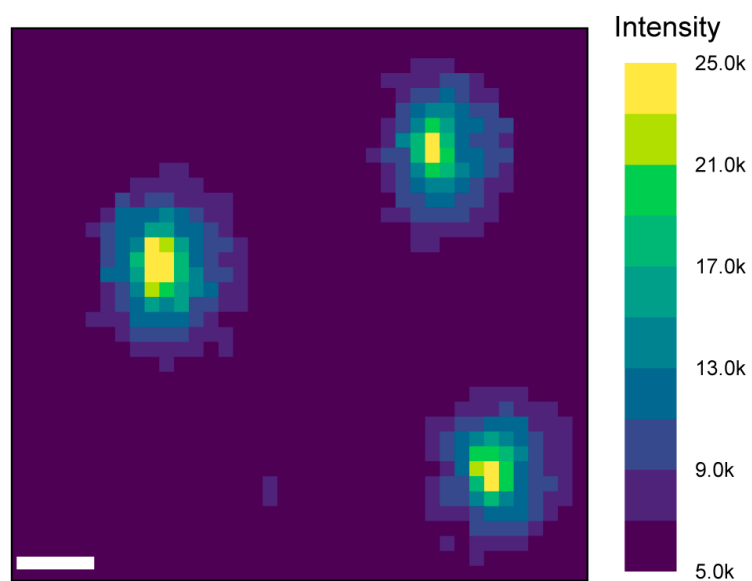


Figure S3. PL mapping image of CVD-grown WS₂ with the external cavities by plotting intensity at 620 nm when the pumping power was 500 W cm⁻². Scale bar is 10 μm.

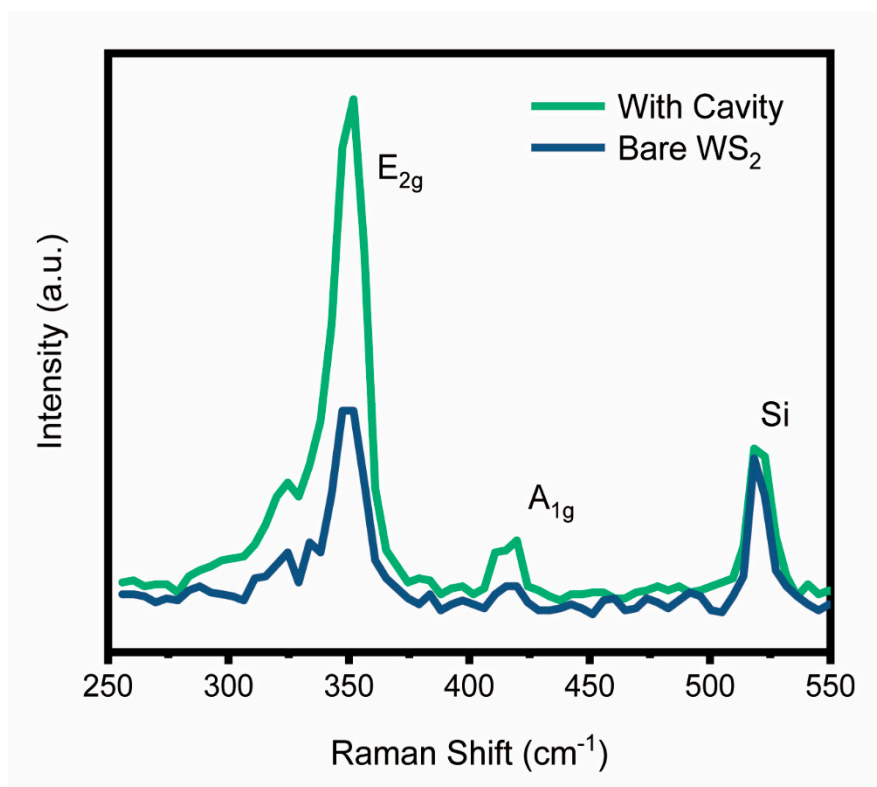


Figure S4. Raman spectra of monolayer WS₂ and WS₂ coupled with the resonant cavity. The difference in wavenumber between E_{2g} and A_{1g} characteristic modes is 62.5 cm⁻¹, which confirms that the CVD-grown WS₂ films are monolayer. The vigorous intensity of Si at 520 cm⁻¹ is another evidence of synthesized ultra-thin WS₂.

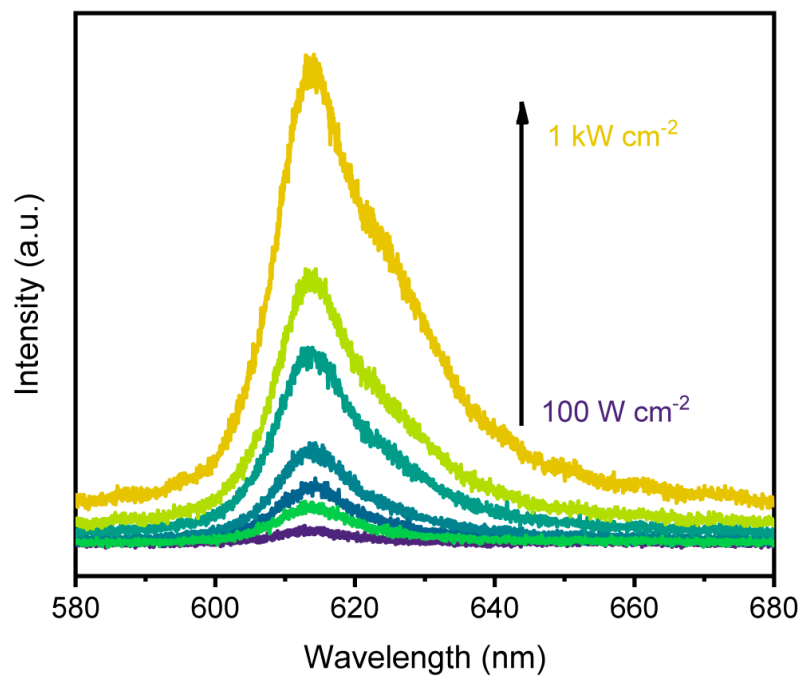


Figure S5. PL spectra of bare WS₂ at different excitation powers. The excitation power is 100 W cm⁻², 200 W cm⁻², 300 W cm⁻², 400 W cm⁻², 600 W cm⁻², 700 W cm⁻², and 1 kW cm⁻² in order from low to high.