

# Supplementary Material for Probing Sulfur Vacancies in CVD grown Monolayer MoS<sub>2</sub> on SiO<sub>2</sub>/Si in the temperature range (750-900°C)

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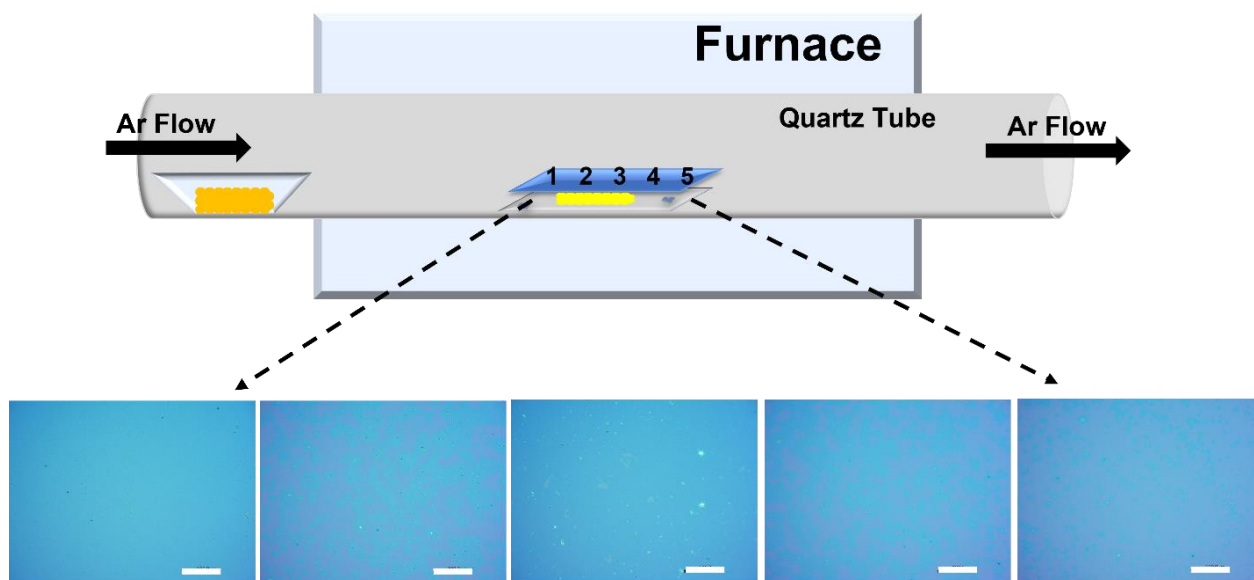
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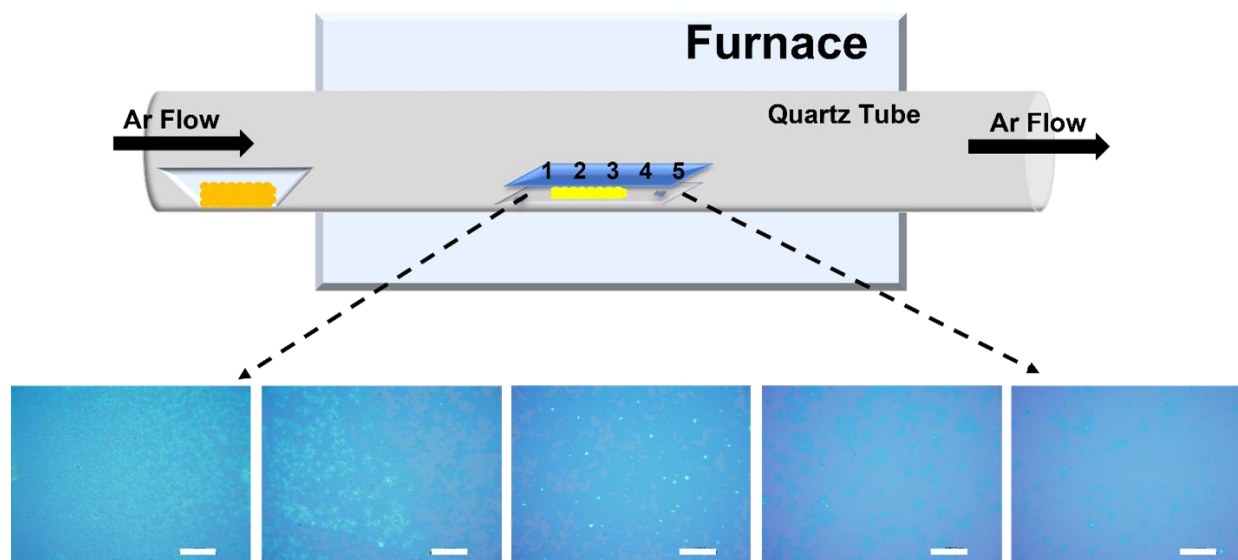
| Growth Temperature | Sulfur Temperature |
|--------------------|--------------------|
| 750°C              | 125°C              |
| 800°C              | 130°C              |
| 850°C              | 132°C              |
| 900°C              | 135°C              |

Table SI Sulfur temperature modulation in relation to the growth temperature.

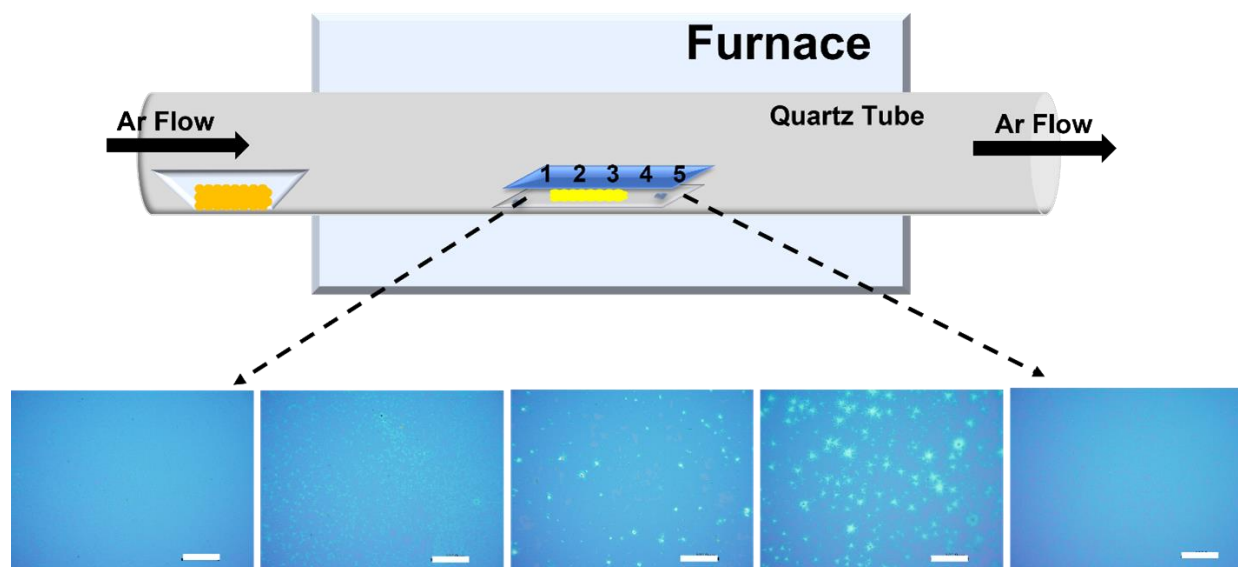
(a)



(b)



(c)



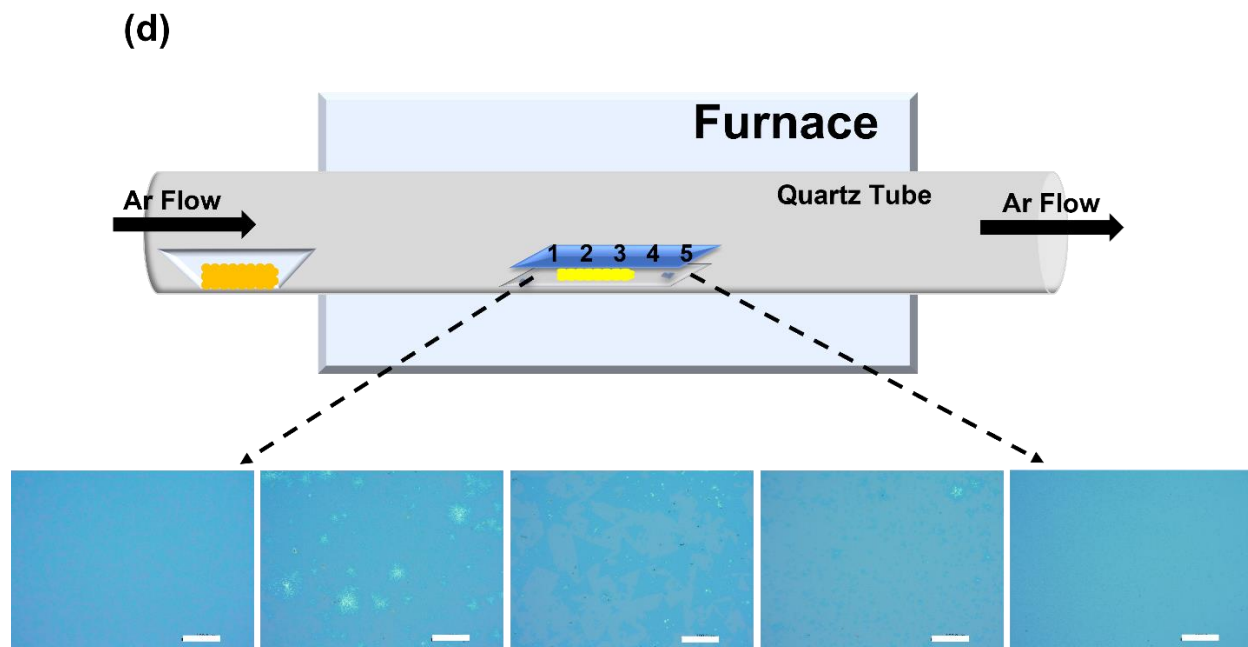


Figure S1 Growth Morphology across the  $\text{SiO}_2/\text{Si}$  substrate at (a) 750°C, (b) 800°C, (c) 850°C, and (d) 900°C growth temperatures respectively. All scale bars are 100µm.

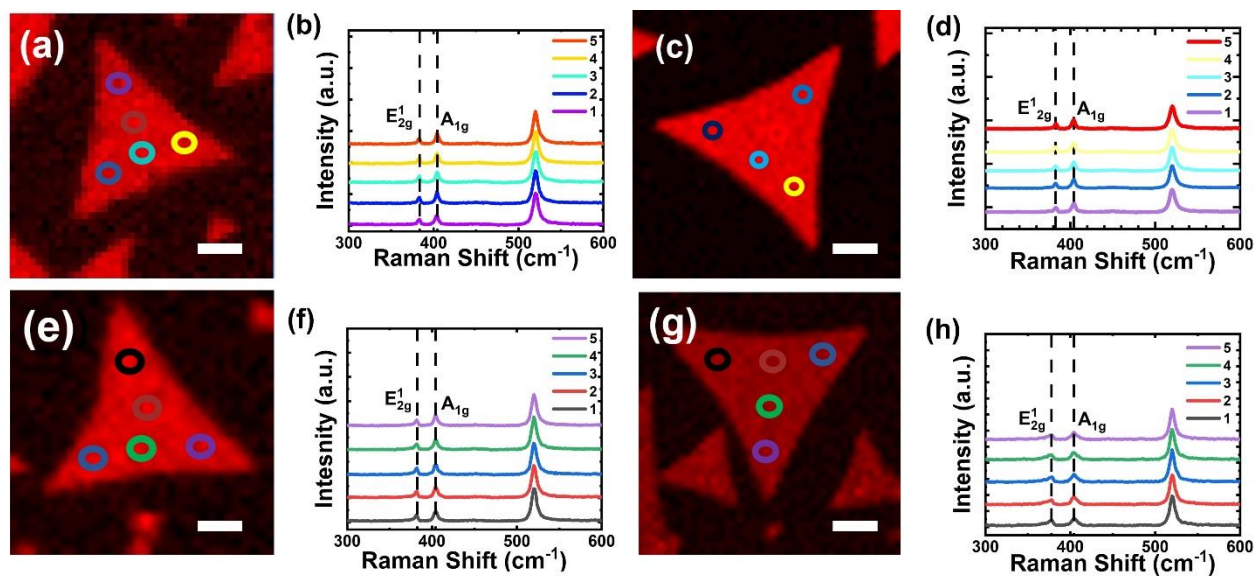


Figure S2 Raman mapping for as grown crystals at different locations for 750°C (a-b), 800°C (c-d), 850°C (e-f) and 900°C (g-h) respectively. All scale bars are 25µm.

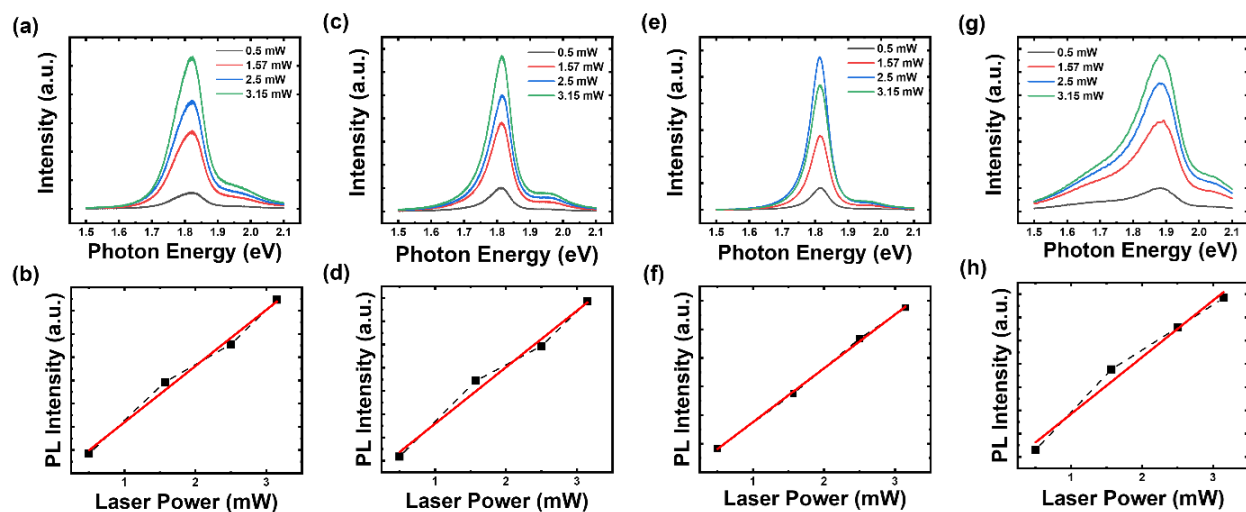


Figure S3 PL Spectra at different laser excitation power and PL Intensity area variation vs different laser excitation power for (a)-(b) 750°C grown crystals, (c)-(d) for 800°C grown crystals, (e)-(f) for 850°C grown crystals, (g)-(h) 900°C grown crystals.