SESSION 5: Advanced materials for surface science and coatings. Preference: ORAL

Different strategies to obtain MoS_2 nanosheets by implementing CVD on different substrates

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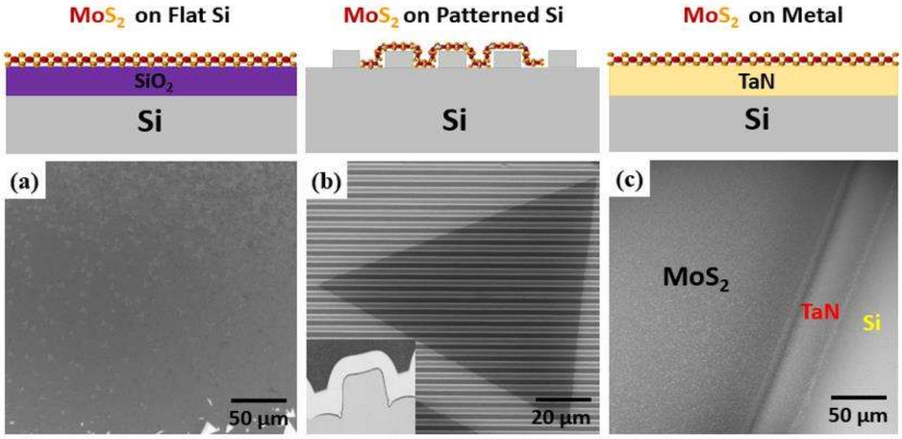
2D Molybdenum disulfide (MoS_2) has shown some tremendous prospective for applications in various fields including micro- and nano- electronics, photonics, optoelectronics and electrocatalysis due to its atomically thin body, rich physics, high carrier mobility and active edge sites. However, controlled synthesis of large area and high crystalline monolayer to few layers MoS_2 remains a challenge for many practical applications. Among the proposed methods, chemical vapor deposition (CVD) is a promising way for synthesizing large-scale MoS_2 nanosheets because of its high flexibility [1]. We explored the effect of various parameters during the CVD process to tune the surface coverage and number of layers on various substrates (SiO2, TaN) and geometry (flat patterned) as shown in figure (a, b, c). In addition, we also investigated the influence of the seeding promoters (PTAS and PTARG); the involvement of the functional groups attached to such molecules on the physical properties of 2D MoS_2 is rarely considered [2]. Here we report a strategy on how to precisely trail the MoS_2 nanosheets for targeting specific applications using CVD. We show the physical properties of so-grown MoS_2 and the overall layers quality by means of Raman spectroscopy and photoluminescence, scanning electron microscopy, atomic force microscopy, and X-ray photoelectron spectroscopy. Our experimental findings confirm the excellent potential of CVD grown MoS_2 to be integrated in device for micro- and nano- electronics, photonics, optoelectronics and electrocatalysis.



References

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