PECULIARITIES OF CVD MOS_2 SYNTHESIS FOR GRAPHENE HETEROSTRUCTURES

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Research on graphene in thin-film heterostructures has been very active in recent years. Such structures have enormous potential for applications in electronics, sensors, solar cells, and more, due to the combination of the unique electrical and optical properties of each material. Among them, graphene/MoS_2 heterostructures demonstrate highly sensitive photodetection and good contact properties that provide efficient injection and charge transfer. CVD synthesis method is excellent for obtaining such heterostructures. But unlike a graphene, the MoS_2 synthesis is bigger challenge because of the presence of two elements and the different operating temperatures of the precursors.

In this work we present a detailed study of the CVD synthesis of molybdenum disulfide from solid precursors on SiO_2/Si substrate for further use in graphene/MoS_2 heterostructures. The effect of changes in temperature, pressure, precursor amount, gas flow rate, and substrate position on the structure and properties of the obtained film was evaluated. Precise control of these synthesis parameters makes it possible to obtain films with a controlled number of layers, defectiveness and homogeneity. Raman spectroscopy and photoluminescence were used to characterize the properties of the MoS_2 films.

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