

Wafer-Scale Highly Oriented Atomiclayer MoS₂ by ion beam sputter

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Abstract

Two-dimensional transition metal dichalcogenides (TMDs) materials is an emergent semiconductor with great potential in next-generation for electronics, but to manufacture of high oriented and large area domain TMDs still remains challenge. TMDs materials are composed of transition metal M(Mo, W) and dichalcogenides X(S, Se, Te). Here, we prepared the large-area molybdenum disulfide (MoS₂) thin films on c-plane sapphire substrate by the ion beam sputter with tube furnace of vulcanization process. We successfully realized materials of atomiclayer MoS₂ uniformity on the 2-inch wafer. These atomiclayers exhibit the high oriented quality ever reported, our Raman spectrum, X-ray photoemission spectroscopy (XPS), X-ray diffraction (XRD), angle-resolved photoemission spectroscopy (ARPES), as evidenced from these spectroscopic. Our work to practical application industry method of atomiclayer MoS₂.

Keywords –TMDs, Ion-Beam Sputter, ARPES.