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Van der Waals Epitaxy of Two-Dimensional α-MoO_3 Nanosheets using Mica as Grown Templates[1] WANG DI, ZHOU YU, WANG MU, PENG RUWEN, XIONG XIANG, Nanjing University — The orthorhombic Molybdenum trioxide, α-MoO_3, is one kind of graphene-like layered materials. Since the great promise for future electronic and optoelectronic application, this molybdenum-based two-dimensional (2D) layer material has recently attracted much attention. In this work, we report a Van der Waals epitaxy of α-MoO_3 nanosheets on mica substrate under ambient pressure. This simple physical vapor-phase deposition process is proposed to medicate through the weak Van der Waals interaction between layered α-MoO_3 and mica substrate. As a result, the grown α-MoO_3 nanosheets, whose lateral dimension is up to 0.1mm and thickness less than 2.8 nm (about bilayer MoO_3 octahedral structure), exhibit defined lattice orientation. From bulk to bilayer, Raman spectra of α-MoO_3 nanosheets show independed with layered number, which unlike to MoS_2. The measurement of electric resistances at room temperature shows the conductance of original α-MoO_3 nanosheets is already high, moreover, which can be greatly improved by hydrogen doping. Our works indicate that VDWE with mica templates is a simple and feasible strategy to grow high-quality ultrathin α-MoO_3 nanosheets, which have superiorities for investigating its novel physical properties and potential application in future.

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