Diode characteristics of n-MoS_2/p-Si heterojunction prepared by atomic layer deposition

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Recently MoS_2 has attracted great attention for electronic and catalyst applications. Diodes of np junction are one of basic elements consisting of electronic and photovoltaic devices. Here, we report diode characteristics in n-MoS_2 (amorphous phase)/p-Si heterojunction. Atomic layer deposition (ALD) was used to grow the amorphous MoS_2 thin film, because the film can be uniformly grown in a manner of layer-by-layer growth at low temperature (100°C). The characteristics of n-MoS_2/p-Si heterojunction diodes were investigated by current-voltage and capacitance-voltage measurements. The heterojunction diodes show a typical rectifying behavior and also exhibit high ratio (~ 10^3) of photocurrent to dark current in the reverse bias region under white light illumination.