Random telegraphic signals observed in atomically thin MoS2 FETs

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Transition metal dichalcogenides (TMDs) have attracted much attention both in condensed matter physics (1, 2) and in ultimately scaled device research (3, 4). It is surprising that 0.65 nm-thick mono-layer MoS2 can work as a FET channel. Although its carrier mobility is not so high compared to that of graphene, the off-current is definitely suppressed thanks to a sufficient energy band gap. Resultantly, MoS2 FET shows a well-controlled subthreshold region. However, it should be noted that perfect crystalline MoS2 is difficult to form, because chalcogen atoms are likely to be desorbed and be deficient (5). These defects are detectable in TMD FETs as the random telegraphic signals (RTSs) (6).

In this talk, we report both simple RTSs and complex RTSs, and discuss the defect-defect interactions possibly causing complex RTSs in MoS2 FETs. In addition, we also discuss a possible application of TMD FETs.

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