Interfacial interaction between $TaSe_2$ and bilayer graphene

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The formation of an interface between two different materials modifies the physical properties even in the van der Waals materials. For example, superconductivity and charge density wave that appear in transition-metal dichalcogenides is significantly perturbed by choosing different substrates. Here we investigate such an interfacial effect between monolayer $TaSe_2$ and bilayer graphene epitaxially grown on a SiC substrate via the direct measure of electron band structures using angle-resolved photoemission spectroscopy [1]. Depending on the structural phase of $TaSe_2$, different amount of charge transfer and band hybridization occur with graphene. The difference originates from the work function of each structural phase of $TaSe_2$ whose relative change is different upon approaching the monolayer limit. These findings provide a viable route towards the engineering of electronic correlations in transition-metal dichalcogenides.

Keywords: interfacial effect, transition-metal dichalcogenides, graphene, electron band structure, angle-resolved photoemission spectroscopy

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