(One page abstract format: including figures and references. Please follow the model below.)

van der Waals Heterostructures of Two-Dimensional Materials for Advanced Electronics

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Abstract (Arial 10)
Among various two-dimensional (2D) materials, graphene has brought a great deal of excitement to our community with its attractive and unique properties. Such excellent characteristics have led many researches on other 2D materials, such as hexagonal boron nitride (hBN), molybdenum disulfide (MoS_2), tungsten diselenide (WSe_2) and so on. Recently, van der Waals (vdW) heterostructures have been achieved by putting 2D materials onto another, in the similar way to build Lego blocks. This enables us to investigate physical properties of atomically-sharp heterostructure interfaces and fabricate high performance optoelectronic devices for advanced applications. Here we demonstrate high performance electronic devices based on vdW heterostructure of 2D materials for various applications, such as transistors, memories, solar cells, and light-emitters. The novel physics hidden in 2D materials and their heterostructures shows a new way toward fabrication of high performance electronic devices as well as new-concept devices, which have not been achieved with conventional materials. Moreover, the vdW heterostructure devices will provide a standard platform for investigation of the intrinsic properties of 2D materials.

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Figures

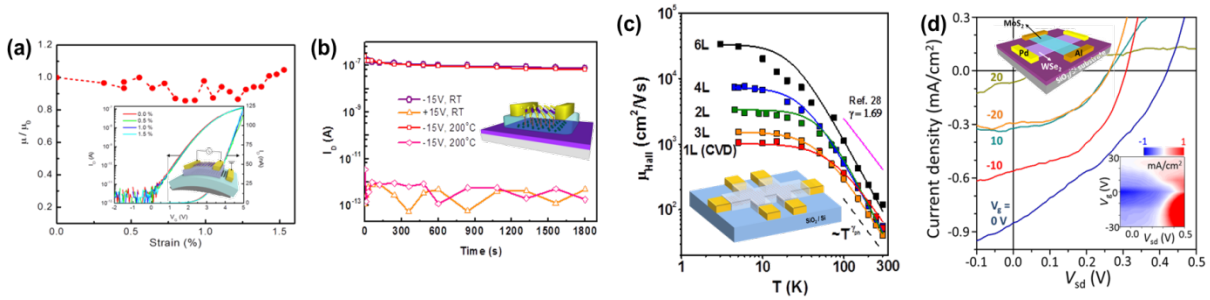

Figure 1. van der Waals heterostructure devices for (a) flexible and transparent transistors, (b) ultrathin memories, (c) ultrahigh mobility devices, (d) atomically thin p-n junctions.