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Tunnel Field-Effect Transistors in van der Waals BP/MoS₂ Device.

Van der Waals (vdW) heterostructures present a promising application for tunneling devices given a minimal trap states in heterostructures due to absence dangling bonds and without lattice mismatch cause of atomic diffusion or dislocation propagation. Here, we demonstrated vertical broken-gap (type-III) BP/MoS₂ van der Waals heterostructures which were with a steep subthreshold swing in transfer characteristic. The band-to-band tunneling current was observed at electrical measurements. This work presents an advance in the fundamental studying of carrier transport mechanisms of the BP/MoS₂ heterostructures transistors, allowing us to investigate the further potential application in broken-gap van der Waals heterostructures.