

Robust Large-Gap Quantum Spin Hall Insulators in Chemically Decorated Arsenene Films

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Based on first-principles calculations, we propose one new category of two-dimensional topological insulators (2D TIs) in chemically functionalized ($-\text{CH}_3$, $-\text{OH}$ and halogens) arsenene films. The results show that the surface decorated arsenene films are intrinsic 2D TIs, which are verified by calculating the edge states with obvious linear cross inside bulk energy gap. The bulk energy gaps range from 0.184 eV for AsCH_3 film to 0.304 eV for AsOH films, which make them suitable to realize quantum spin Hall effect in an experimentally accessible temperature regime. These novel 2D TIs are potential candidate in future electronic devices with ultralow dissipation.

Biography:

Dongchao Wang gained his Ph.D from School of Physics, Shandong University. He joined the institute of condensed matter physics, school of physics and electric engineering, Linyi University in July 2016. His major is in the area of condensed matter theory, nanostructures and quantum devices. His research project is on theoretical and computational studies of structural and electronic properties of two-dimensional materials.