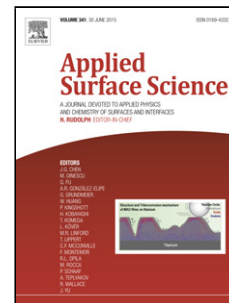


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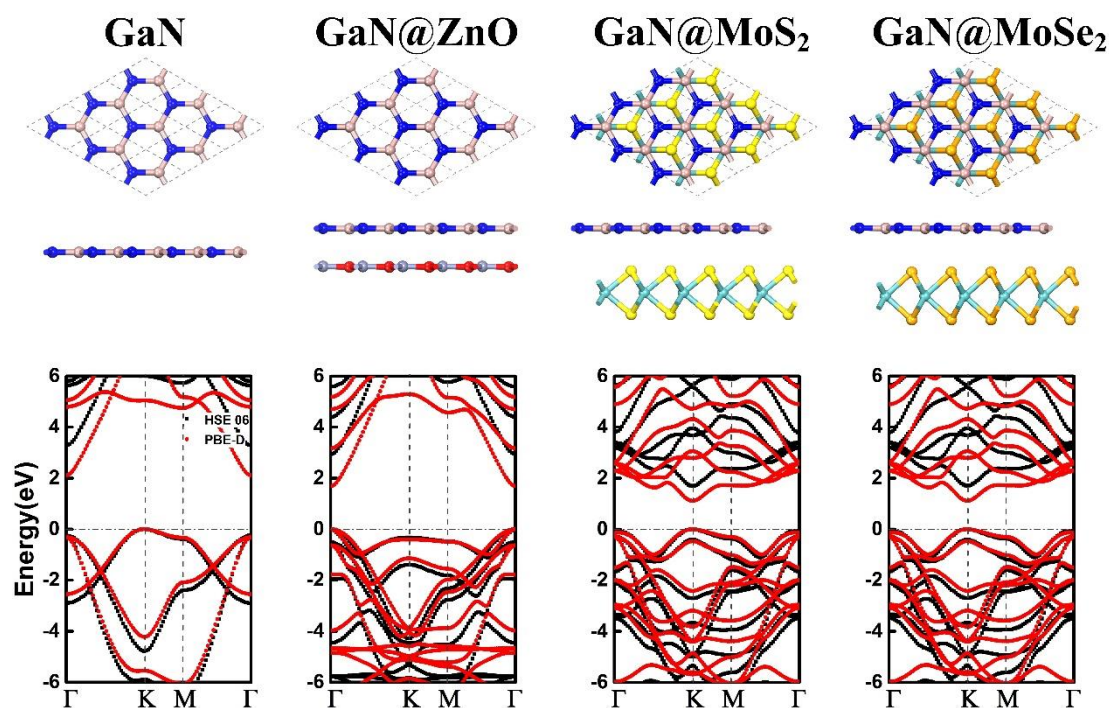
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Graphical abstract



The direct band gaps are observed in all graphene-like GaN heterostructures (hybrid with ZnO, MoS₂ or MoSe₂), which, as well as the optical properties can be tuned by strains and external electric fields effectively.

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