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Review

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Two dimensional materials based photodetectors

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Highlights

In this review, we summarized the latest works about the applications of 2D materials (graphene, TMDCs, BP, h-BN) and some layered-materials (GaS, GaSe, InSe) based photodetectors in different wavelength ranges including ultraviolet, visible-near infrared, middle-far infrared and terahertz. In addition to single material based photodetectors, we also summarized many strategies including coupling other materials (quantum dots, ferroelectric polymer, ZnO, plasmonic antennas, waveguides, optical microcavity) or fabricating, heterostructures and so on. We believe that this review would be much helpful for the readership in this field and would attract a broad interest.

Abstract

Two-dimensional (2D) materials represented by graphene show numerous attractive electronic, optical, mechanical, and thermal properties. Especially, the extraordinary electronic and optical properties make 2D materials promising candidates for photodetectors to replace traditional ones that fails to meet the growing demands of many fields such as high frequency communication, national security, novel biomedical imaging and so on. However, several challenges must be overcome before the realization of commercially viable 2D materials-based photodetectors, such as the low photoresponsivity of intrinsic graphene due

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