# Article information:

Progress and Insight of Van der Waals Heterostructures Containing Interlayer Transition for Near Infrared Photodetectors - Ahmad - Advanced Functional Materials - Wiley Online Library
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# Article summary:

1. 2D van der Waals (vdWs) heterostructures have outstanding properties, including high optical absorption, negative differential conductance, and broad-band spectrum range.

2. Type-II band alignment in 2D vdWs heterostructure offers many fascinating benefits, such as rapid carrier separation at the heterostructure interface, larger optical absorption spectral band for broadband detection, and interlayer transition mechanism that can break the bandgap limitation and achieve high optical parameters.

3. Strong binding energy is required to achieve strong interlayer transition in type-II vdWs heterostructures, which can be calculated from density functional theory. Vertical stacking technique can construct type-II band structures in vdWs heterostructures with sharp peaks in the density of states (DOS).

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

该文章是一篇关于2D材料中van der Waals异质结构在近红外光电探测器中的应用的综述性文章。文章介绍了不同类型的vdWs异质结构及其在光电子器件中的应用，重点讨论了type-II异质结构的优势和特点。

然而，该文章存在一些潜在偏见和局限性。首先，文章没有提到其他类型的vdWs异质结构在光电子器件中的应用，可能会导致读者对这些异质结构的理解不够全面。其次，文章过于强调type-II异质结构的优势，可能会忽略其他类型异质结构在某些方面的优势和适用性。此外，文章没有探讨type-II异质结构在实际应用中可能面临的挑战和风险。

另外，在介绍type-II异质结构时，文章提到了密度泛函理论计算出来的键合能对于强化层间转移机制具有重要影响。然而，该方法也存在一定局限性，并不能完全反映实验结果。因此，在使用理论计算结果时需要谨慎，并与实验结果相互印证。

总之，虽然该文章提供了有价值的信息和洞察力，但仍需注意避免片面报道、偏袒、缺失考虑点等问题，并更加平衡地呈现双方观点以及可能存在的风险和挑战。

# Topics for further research:

* Other types of vdWs heterostructures in optoelectronic devices
* Advantages and suitability of other types of heterostructures
* Challenges and risks of using type-II heterostructures in practical applications
* Limitations of density functional theory calculations
* Balanced presentation of different viewpoints
* Potential biases
* omissions
* and considerations to avoid

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