# Article information:

Improvement of Visible-Light Photocatalytic Efficiency in a Novel InSe/Zr2CO2 Heterostructure for Overall Water Splitting,The Journal of Physical Chemistry C - X-MOL  
<https://www.x-mol.com/paper/5668702>

# Article summary:

1. A novel two-dimensional (2D) InSe/Zr2CO2 van der Waals heterostructure has been found to have unexpected visible-light absorption, low recombination of electron–hole pairs, and high carrier mobility for overall water splitting photocatalysis.

2. The 2D InSe/Zr2CO2 heterostructure has a direct band gap of 1.81 eV, which is favorable for visible-light photocatalysis, and its type-II band alignment leads to significant electron–hole separation with electrons (holes) localized in the InSe (Zr2CO2) monolayer.

3. The optical absorption coefficient is large (105 cm–1), and the electron (hole) mobility reaches up to 104 (103) cm2 V–1 s–1, which is beneficial for enhancing its photocatalytic efficiency.

# 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:

The article provides a detailed analysis of the potential advantages of a novel two-dimensional (2D) InSe/Zr2CO2 van der Waals heterostructure for overall water splitting photocatalysis using first-principles calculations. The article presents evidence that supports its claims such as the direct band gap of 1.81 eV, type-II band alignment leading to significant electron–hole separation with electrons (holes) localized in the InSe (Zr2CO2) monolayer, large optical absorption coefficient (105 cm–1), and high electron (hole) mobility reaching up to 104 (103) cm2 V–1 s–1. However, there are some points that could be further explored such as possible risks associated with this technology or counterarguments from other researchers in the field that could provide additional insight into this topic. Additionally, it should be noted that the article does not present both sides equally as it only focuses on the potential advantages of this technology without exploring any potential drawbacks or limitations.

# Topics for further research:

* Risks associated with 2D InSe/Zr2CO2 van der Waals heterostructure
* Limitations of 2D InSe/Zr2CO2 van der Waals heterostructure
* Counterarguments to 2D InSe/Zr2CO2 van der Waals heterostructure
* Potential drawbacks of 2D InSe/Zr2CO2 van der Waals heterostructure
* Alternatives to 2D InSe/Zr2CO2 van der Waals heterostructure
* Advantages and disadvantages of 2D InSe/Zr2CO2 van der Waals heterostructure

# Report location:

<https://www.fullpicture.app/item/66ff23a900d5226f2142e3f1ef84803a>