جامعة الملك فهد للبترول والمعادن
King Fahd University of Petroleum & Minerals

Ultra-Wide Band Gap Semiconductors

PHYS336 Project

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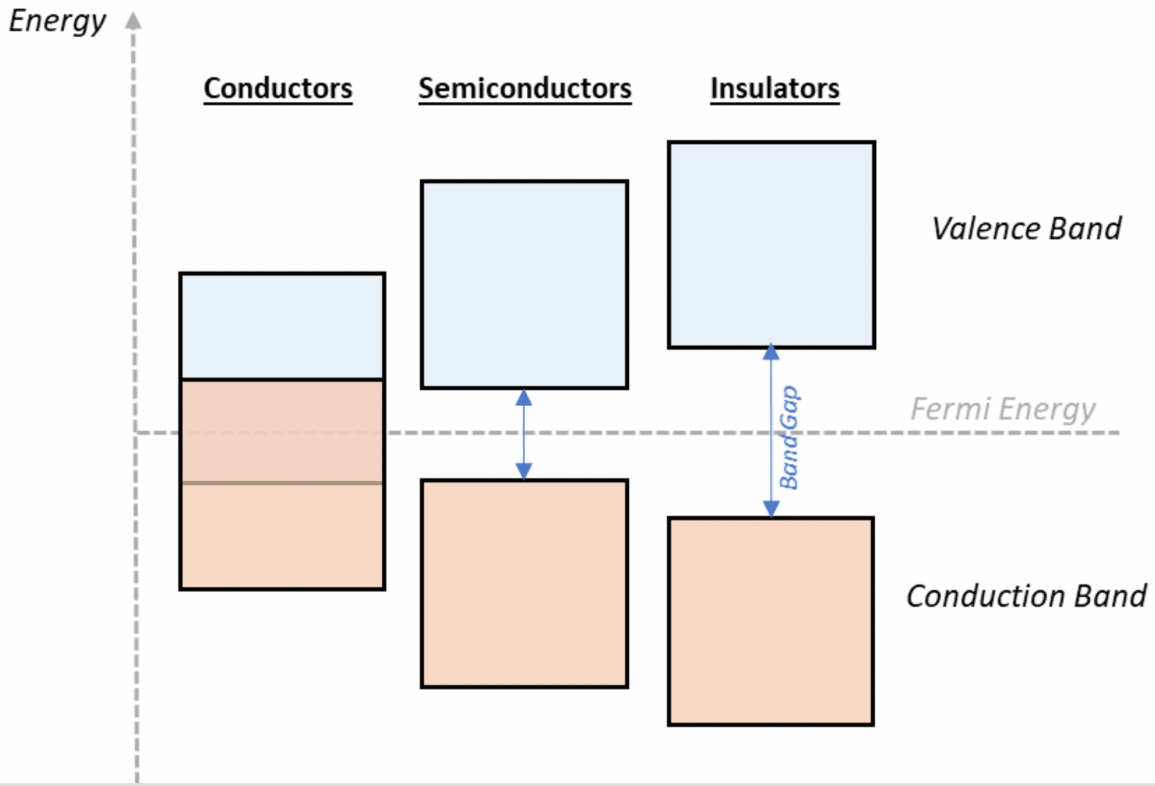
Outline

Ultra-Wide Band Gap Semiconductors

Definition

A semiconductor is a type of material that is intermediate in electrical conductivity between a conductor and an insulator.



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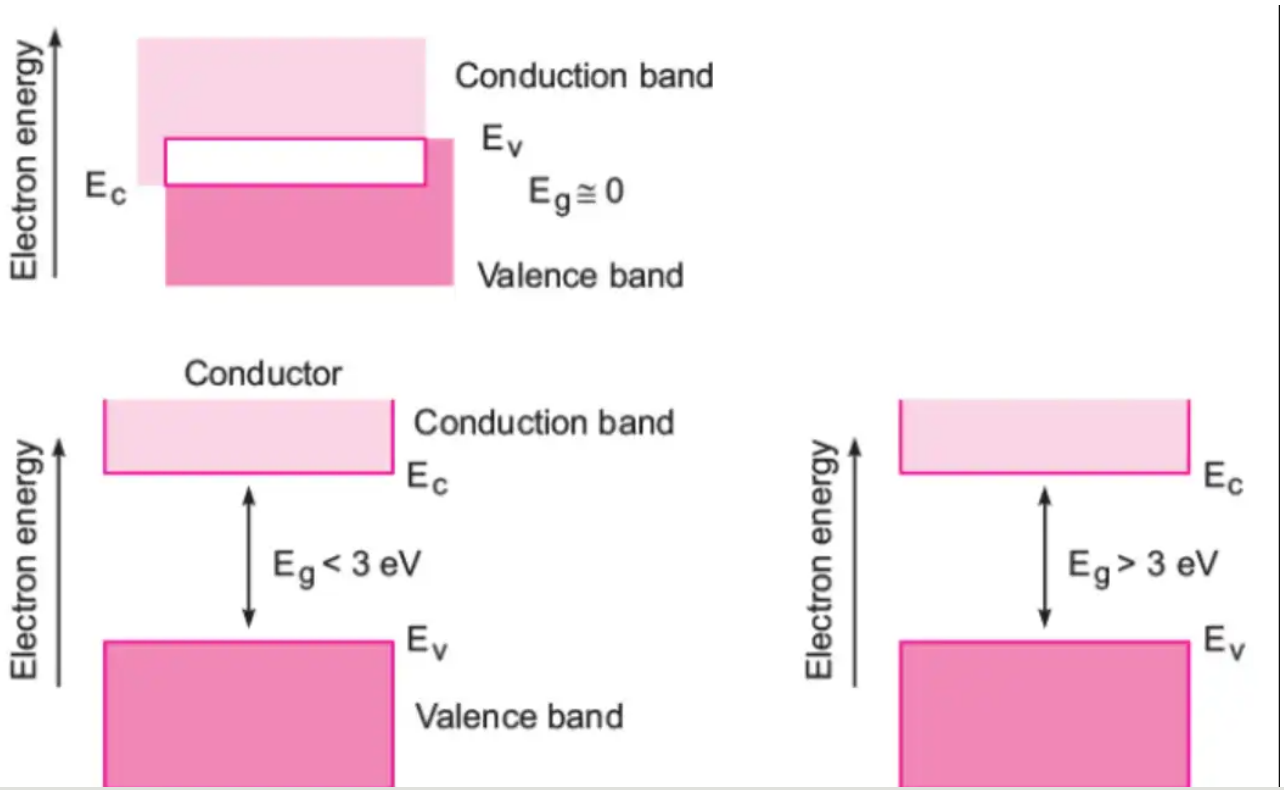

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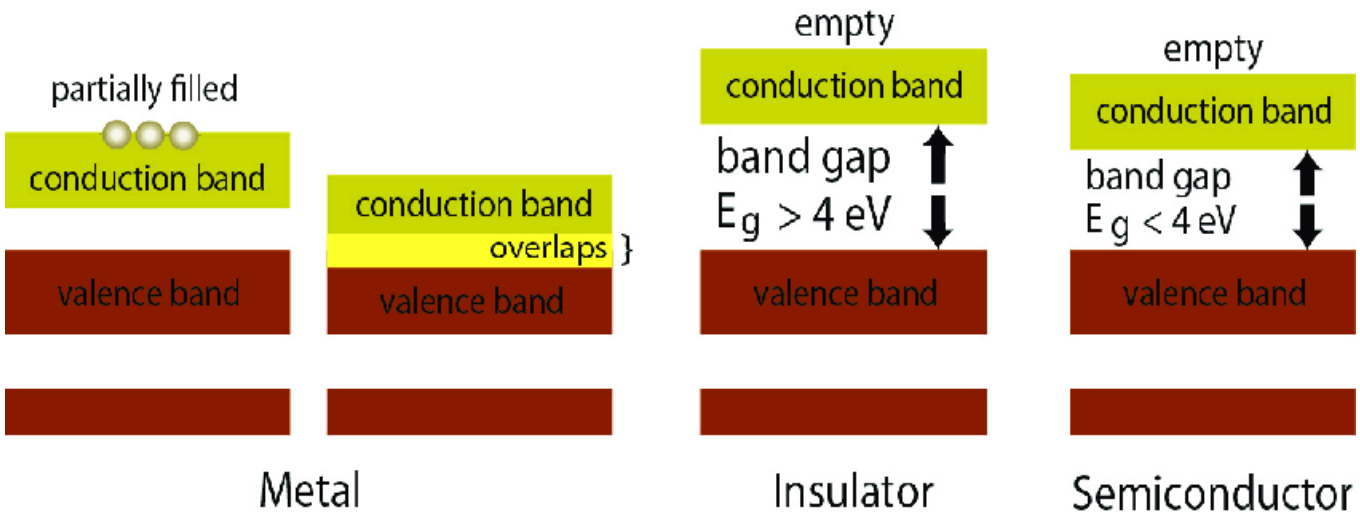

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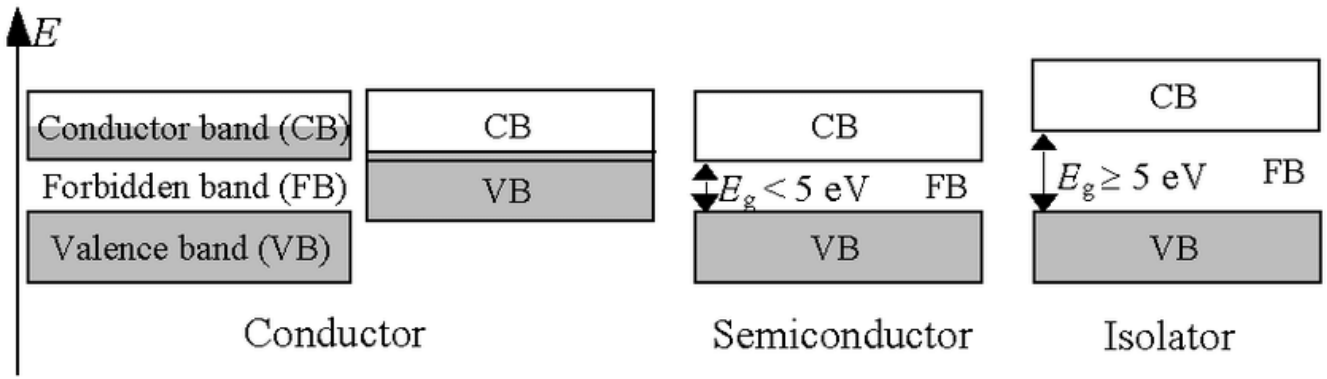

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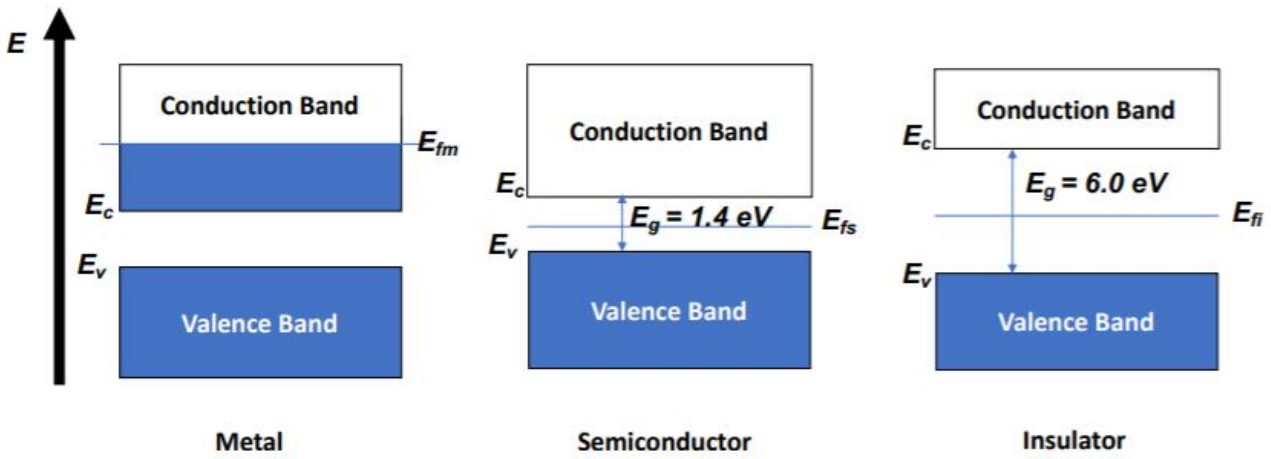

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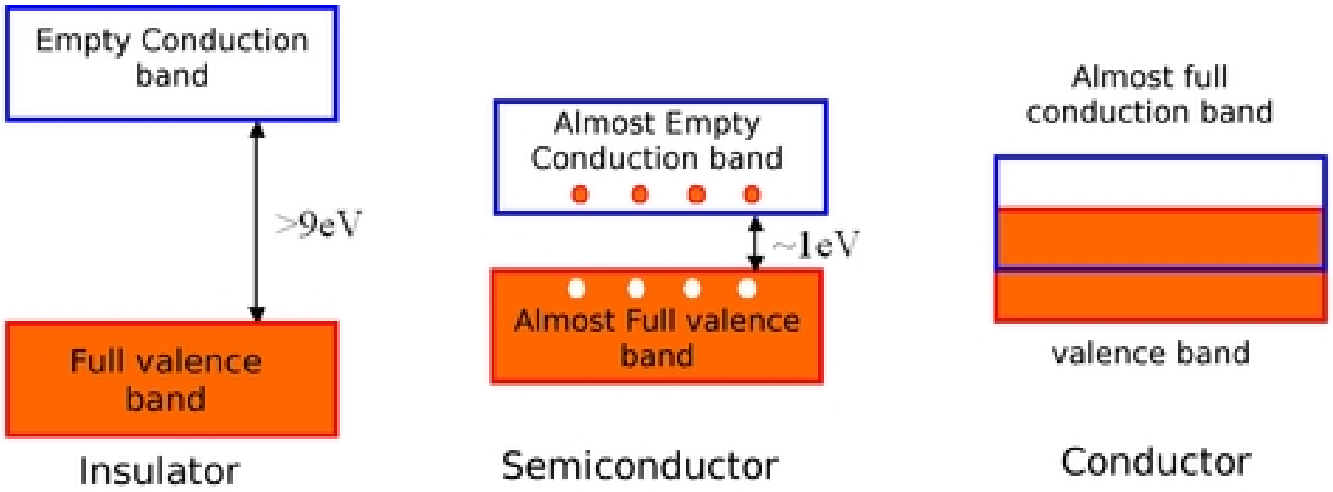
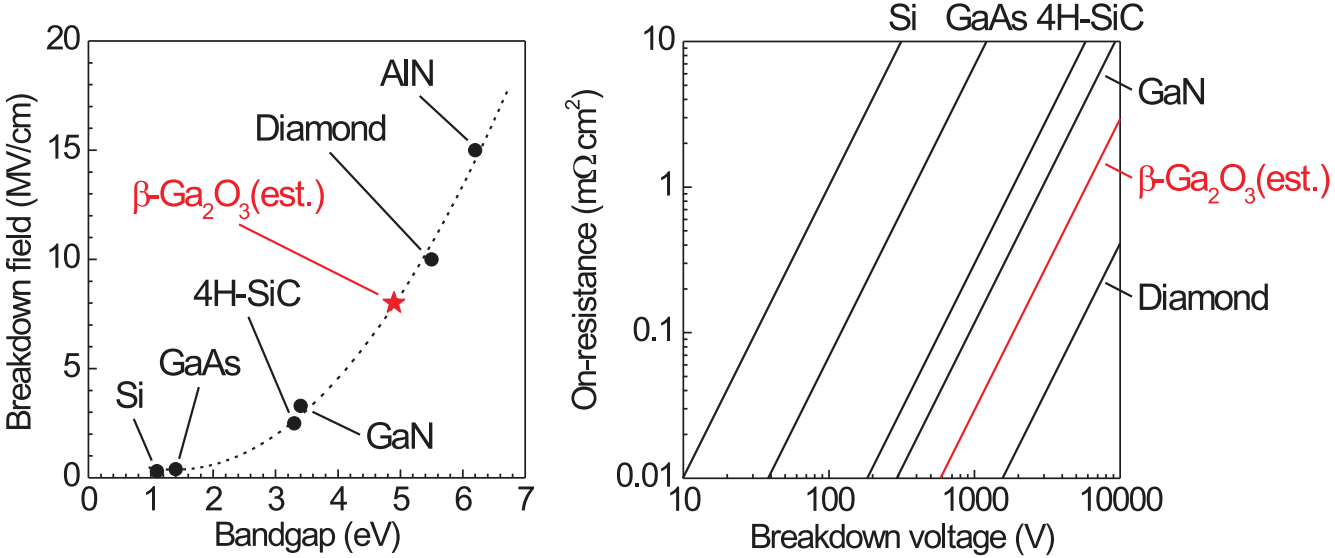


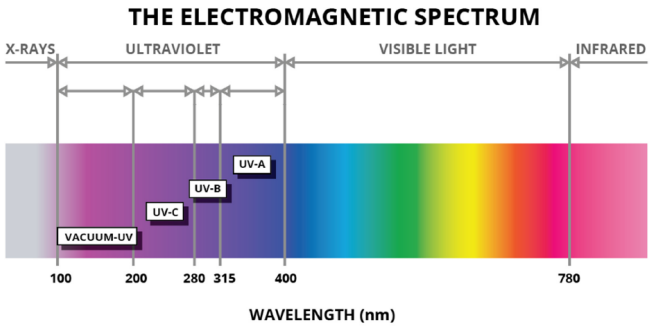
Why?

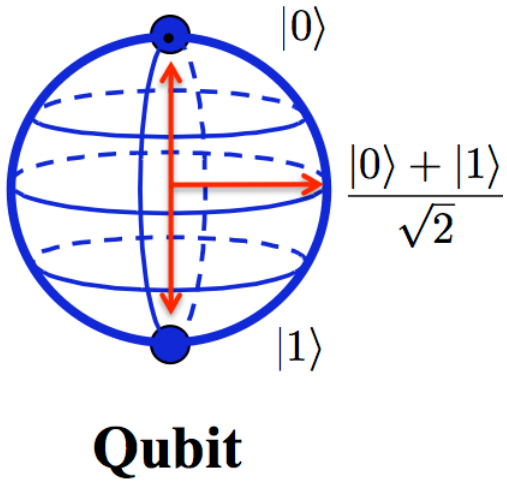


- Higher Tolerance to Electric Field.
- Power Electronics.
- Emission of UV Light.

Promising Applications

- Electric Cars.
- UV Photonics for Pandemic Prevention and Space Exploration.
- QBits Encoding.
- High-Voltage Power Electronics.
- High-Power RF Amplifiers.





Advantages

- High breakdown voltage.
- High thermal stability.
- High frequency operation.
- High power density.
- Improved radiation resistance.

Disadvantages

- Limited availability of materials.
- High cost of production.
- Temperature sensitivity.
- Limited flexibility in device design.

Conclusion

- Ultra wide band gap semiconductors have the potential to revolutionize the electronic device industry due to their unique physical properties.
- These semiconductors have the ability to operate at higher temperatures, frequencies, and power densities compared to traditional semiconductors.
- However, their limited availability, high cost of production, and poor electrical conductivity pose challenges to their widespread adoption.
- Further research and development is needed to address these challenges and unlock the full potential of ultra wide band gap semiconductors.

Thank you!
Questions?