Ultra-wide Bandgap Ga_2O_3 Diodes for Next-Generation Power Electronics

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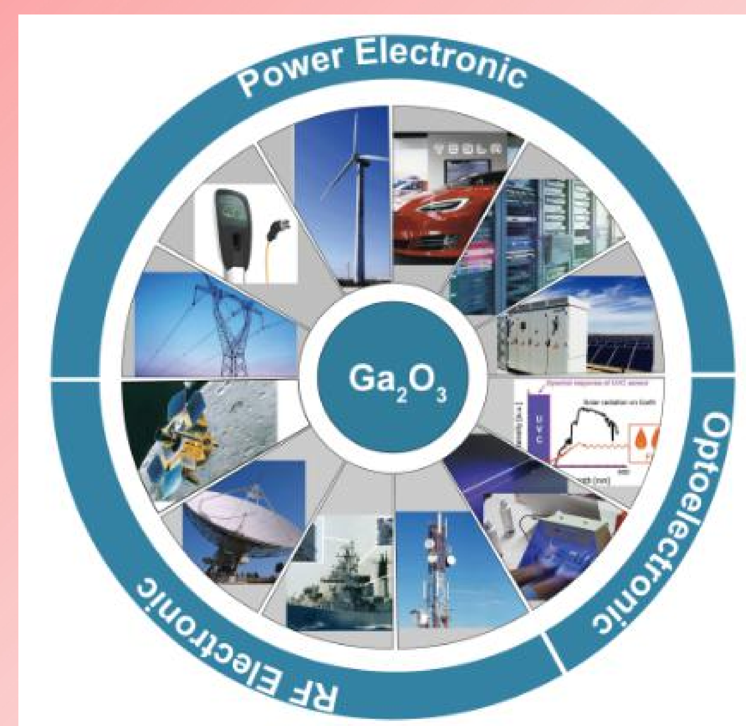
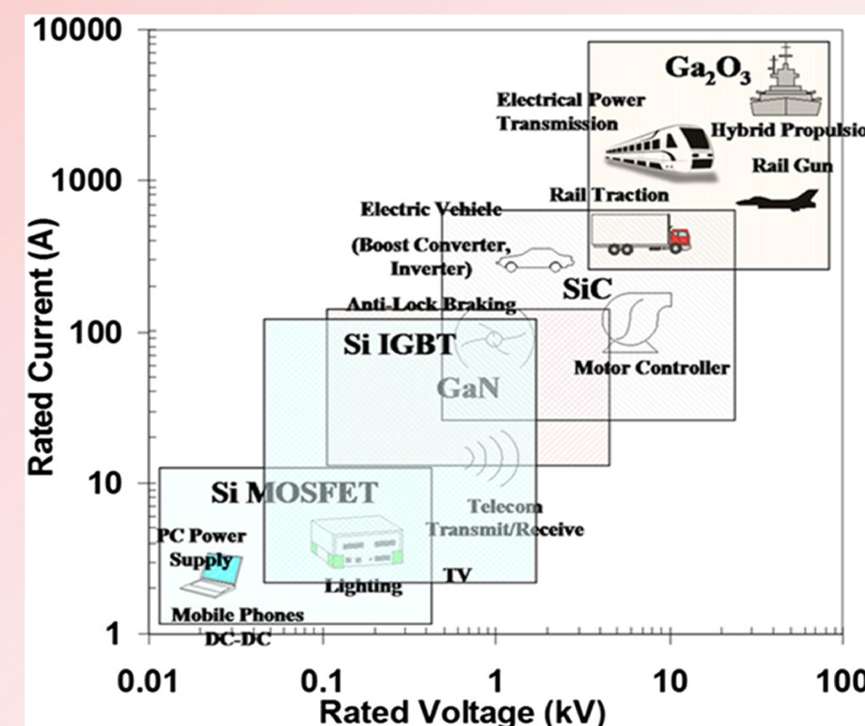
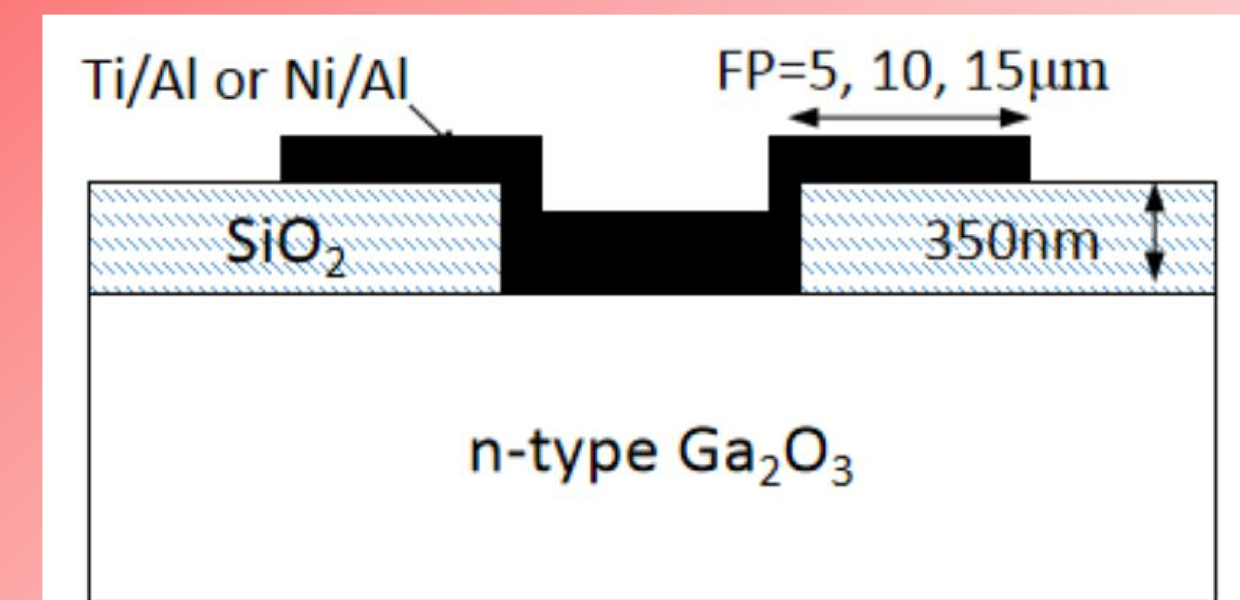
Motivation

- Today's power electronic systems for power generation, power conversion, power transmission demand mega- to giga-Watt power.
- Conventional Si (E_g=1.12eV) based devices are limited to operation at low junction temperatures and low voltages.
- There is a strong incentive to develop power devices from wide bandgap semiconductors for high power ratings, more efficient energy conversion and management.
- The emerging single-crystal ultra-wide bandgap semiconductor Ga_2O_3 (E_g=4.85eV) is desirable for future power electronics

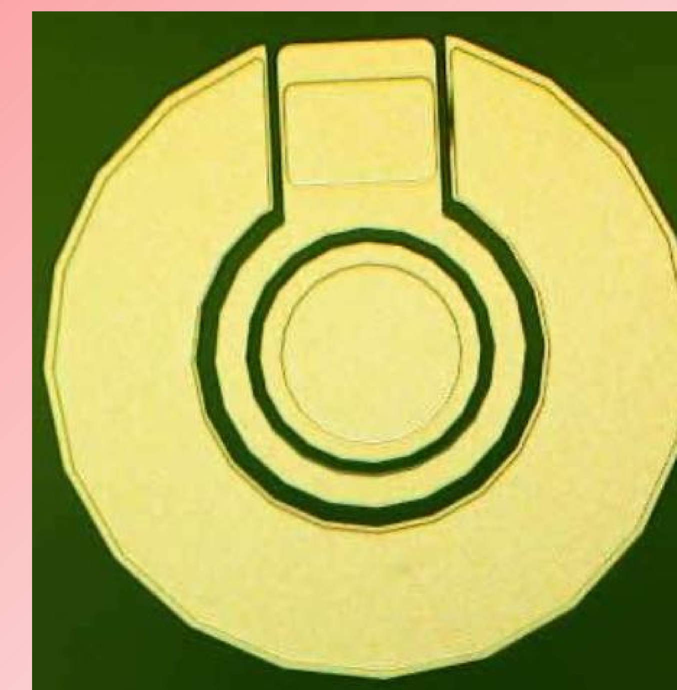


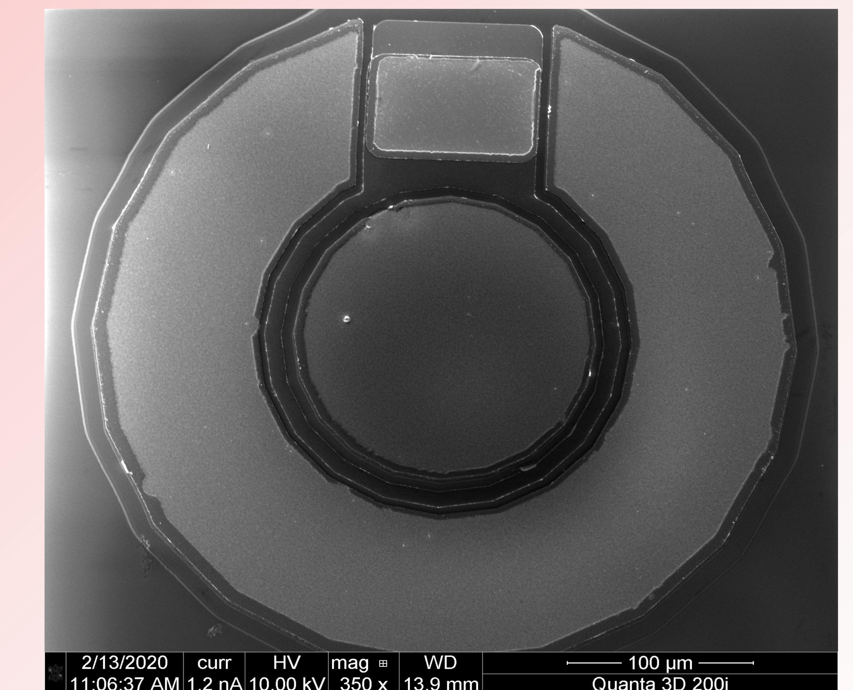


Device Structure

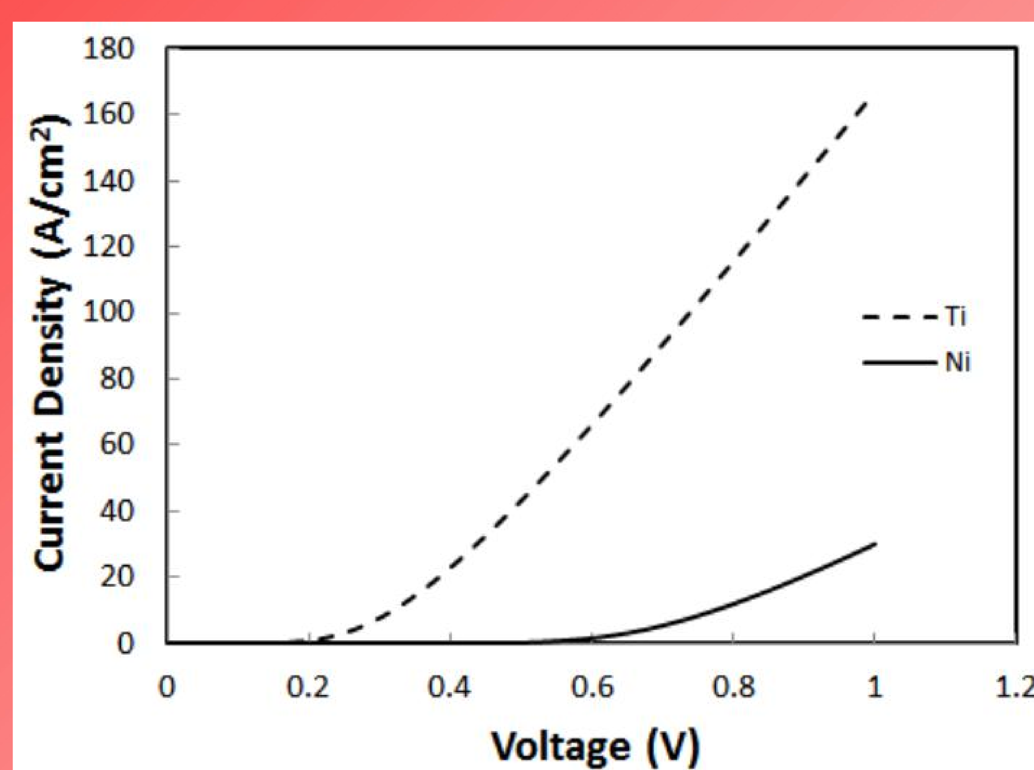


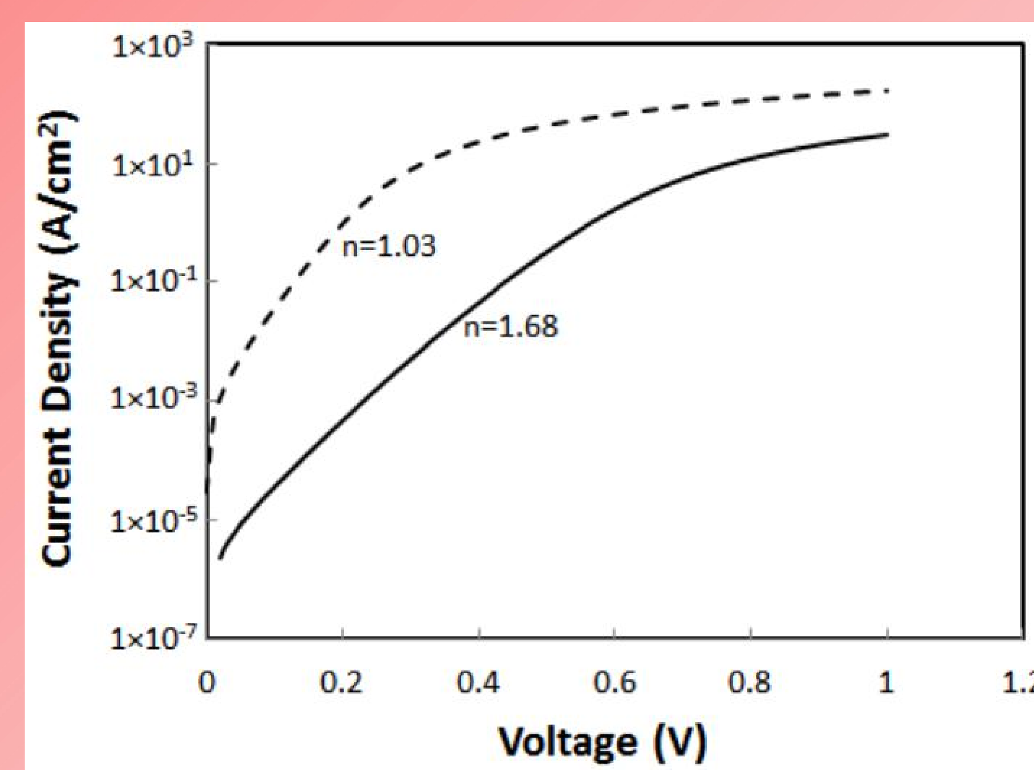
Ga_2O_3 Schottky barrier diode (SBD) with Ti and Ni as anode metals and field plate (FP) edge termination technology

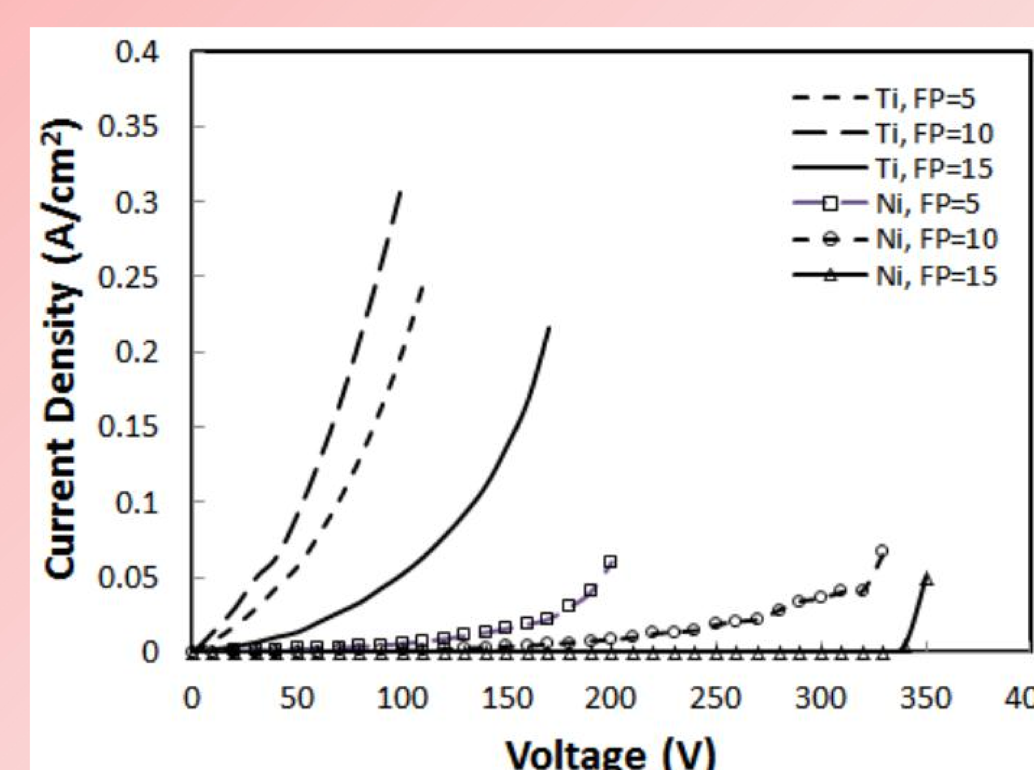


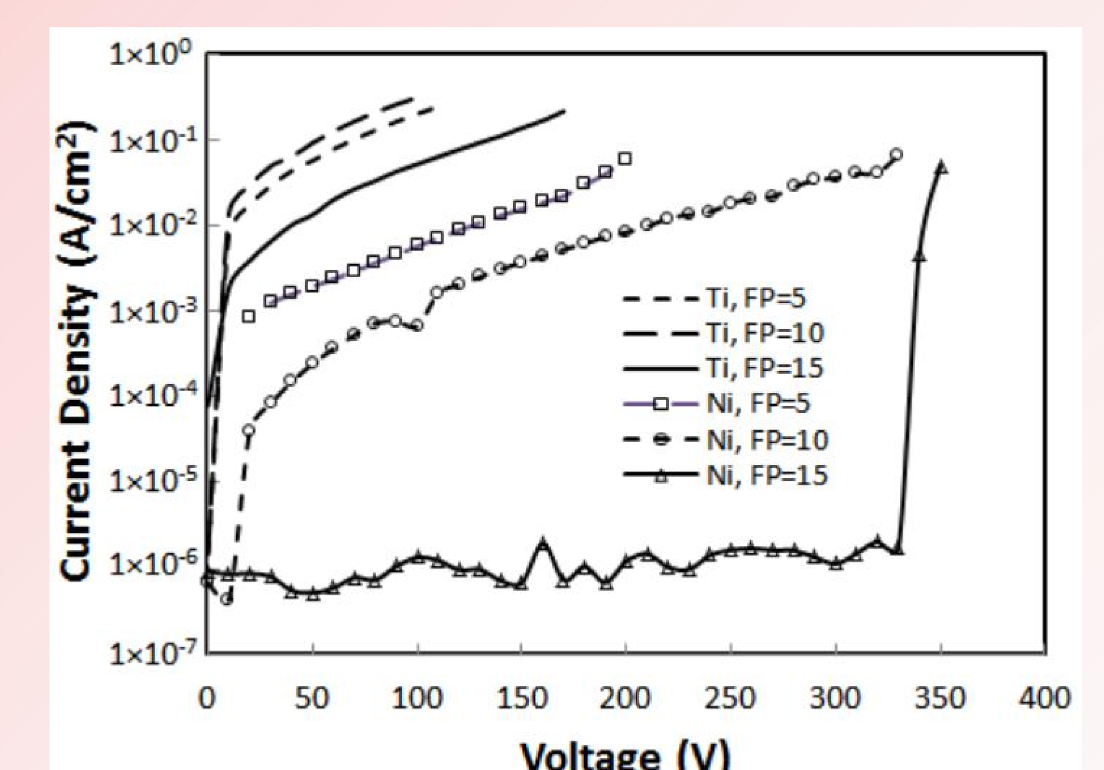


Device Characterization Results









Conclusion

- Ga_2O_3 SBD devices blocking 350V were designed, fabricated, and tested.
- Ti and Schottky metals demonstrated opposite effects on forward conduction current and barrier height, and reverse leakage current and blocking voltage.

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