

## Growth and characterization of new functional materials

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Research results on some new functional materials in our group were reported.

1. The growth of SiC crystals with low micropipe densities has been developed, and the mean micropipe densities of crystals can be controlled to be less than  $10 \text{ cm}^{-2}$ . 4-inch diameter SiC crystals have been obtained.
2. Quasi-hexagonal primary microrods of  $\text{SnO}_2$  were synthesized and then facet-selectively secondary nanobranches were grown on these microrods without use of any catalyst or surface modification, which may provide a useful route for connecting nanobuilding blocks into some desired hierarchical nanostructures and nanodevices.
3. A novel borate  $\text{KZnB}_3\text{O}_6$  was synthesized under ambient pressure, which is built from edge-sharing  $\text{BO}_4$  tetrahedra and is stable up to its melting point. Our work demonstrates high pressure is not an indispensable condition for formation of edge-sharing  $\text{BO}_4$  polyhedra, and that basic question should be readdressed toward the original hypothesis.
4. Ferromagnetism is observed in neutron irradiated 6H-SiC at low temperature of 5K. Vacancies are the main sources that tend to the long range spin order in SiC.