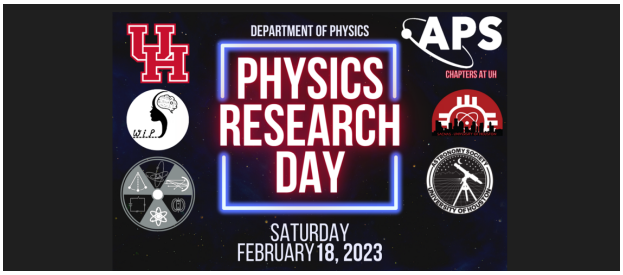

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Synthesis of cubic boron arsenide single crystal with ultrahigh thermal conductivity

Saturday 18 February 2023 14:50 (20 minutes)

As the dimensional shrinkage of modern electronic and optoelectronic devices, materials with high thermal conductivity are required for the significantly increased demand for heat dissipation. Among metals and other bulk materials, cubic boron arsenide (c-BAs) is considered a promising material for heat dissipation of its ultrahigh thermal conductivity, κ, and outstanding semiconductor properties. Unlike in a common process, the ultrahigh thermal and electrical transport properties of c-BAs were first predicted by the numerical calculation research using the first-principles method. Later, experimental researchers synthesized high-quality crystals, which properties matched the theoretical prediction.

The traditional method to synthesize c-BAs single crystals is a chemical vapor transport (CVT) method. In this research, the CVT process to synthesize c-BAs will be introduced and discussed. Also, some potential solutions will be proposed to improve the quality of the c-BAs single crystals.

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