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Synthesis and Characterization of 2D Atomic Layers

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ABSTRACT

As electronic devices have continued to become smaller, a pressing need has developed for new technologies in order to surpass current size constraints. As such, 2-dimensional materials have become a topic of great interest in experimental device research. Monolayer black phosphorus, or phosphorene, is one such 2D material which shows significant potential as a p-type semiconductor. Phosphorene exhibits a number of unique and desirable electrical properties such as a layer-dependent band gap, high carrier mobility, and anisotropic conductivity. An investigation into optimal growth of black phosphorus, the precursor material to phosphorene, as well as characterization of phosphorene-based devices will be performed.

KEYWORDS

Black phosphorus, phosphorene, 2D, 2-dimensional, semiconductor