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Synthesis of black phosphorus films and particles by ultra-fast laser ablation[1] GANG QIU, QIONG NIAN, YEXIN DENG, BIWEI DENG, SHENGYU JIN, ADAM CHARNAS, GARY CHENG, PEIDE YE, purdue university — Few-layer black phosphorus (BP) has become one of top interests among various 2D materials because of its outstanding electrical and optical properties. However, availability of large size BP thin films stands as a major roadblock against further research and its applications. Here we report a method of synthesis BP films and particles by employing ultra-fast laser ablation. We demonstrated that arbitrary BP film patterns can be defined by laser direct writing. BP particles were also achieved as byproduct through manipulating laser power and frequency. Physical mechanism of laser ablation process was investigated, which also provides an optimizing strategy of improving BP thin film quality.

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