## **Supporting information**

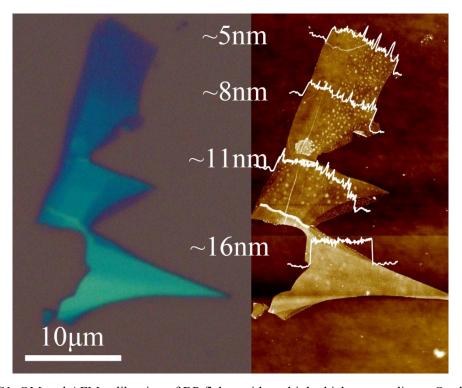
## Improve the Quality of Black Phosphorus by Selecting Mineralizer

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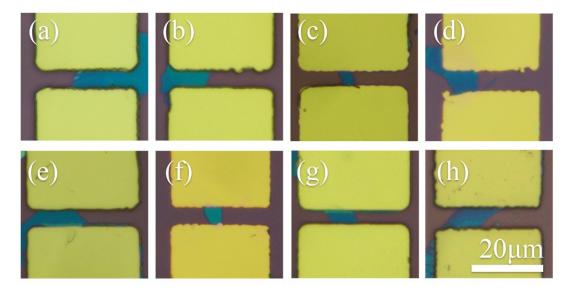
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**Figure S**1. OM and AFM calibration of BP flakes with multiple thickness gradients. On the left is a BP flakes on the substrate (300 nm SiO2/Si), and on the right is an AFM image, and the thickness is calibrated. In comparison, BP gradually changed from a light blue of 16 nm to a deep purple of 5 nm. The color represented by the thickness of about 10 nm is dark blue, which is the thickness of the device we prepared.



**Figure S**2. Optical photos of devices. (a-d) Devices based on Sn-BP. (e-h) Devices based on Pb-BP.