

Supporting Information

Temperature-dependent Raman scattering investigation on vdW epitaxial $\text{PbI}_2/\text{CrOCl}$ heterostructure

Siwen You ^{a,#}, Xiao Guo ^{a,#}, Junjie Jiang ^a, Dingbang Yang ^a, Mingjun Li^a, Fangping Ouyang ^{a,b},
Haipeng Xie ^a, Han Huang ^{a,*}, Yongli Gao ^c

^a Hunan Key Laboratory of Super-microstructure and Ultrafast Process, School of Physics and Electronics, Central South University, Changsha 410083, P. R. China.

^b School of Physics and Technology, Xinjiang University, Urumqi 830046, People's Republic of China

^c Department of Physics and Astronomy, University of Rochester, Rochester, New York 14627, United States.

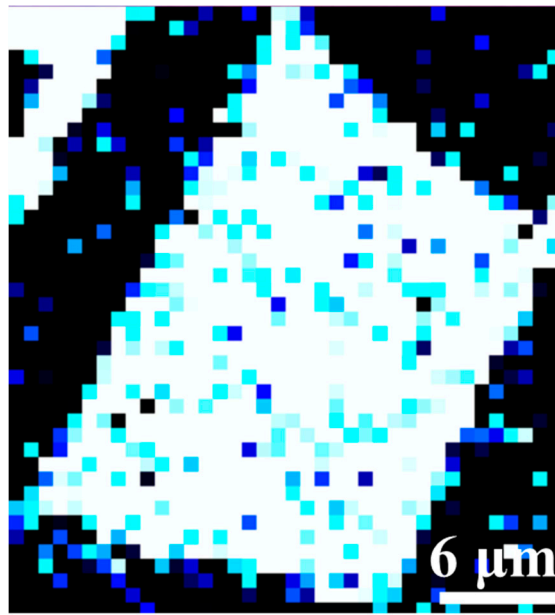


Figure S1 Raman intensity mapping image of A_g^1 mode of exfoliated CrOCl nanoflake.

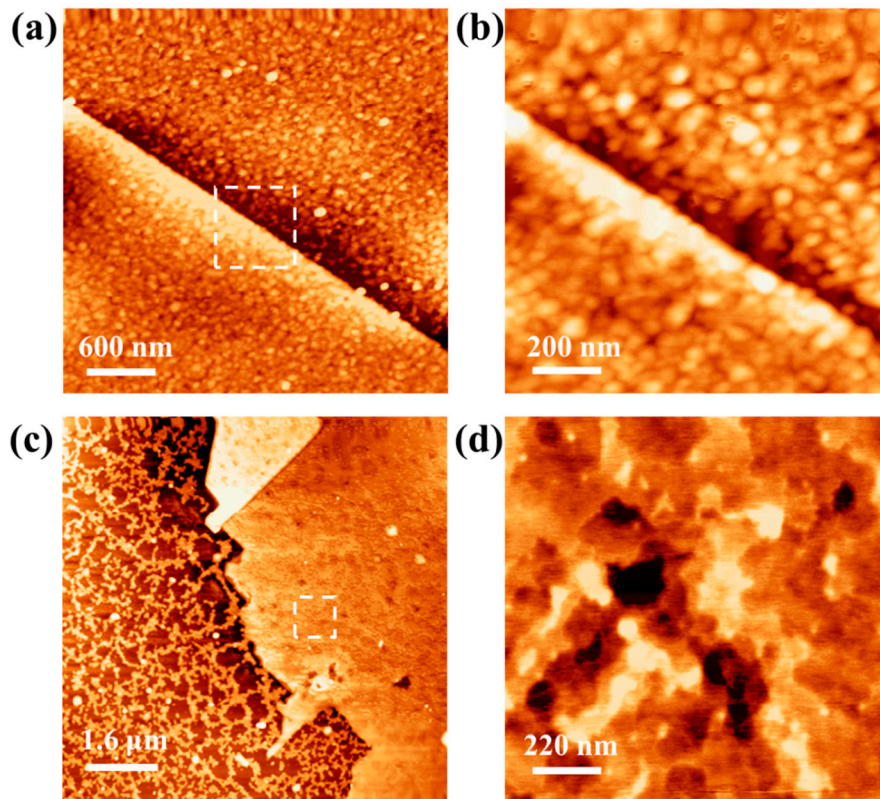
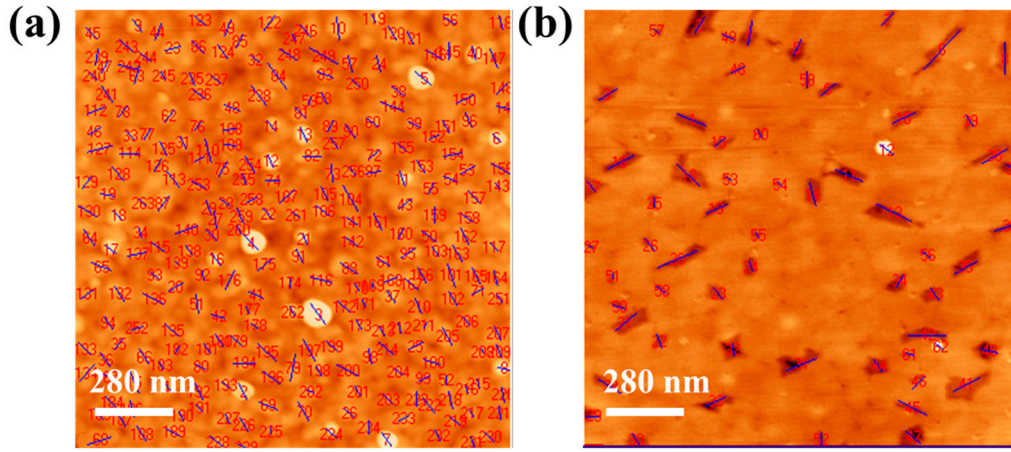


Figure S2 AFM images of PbI₂ films annealed at 373 K (a) and 473 K (c) after deposited at room temperature. (b, d) The corresponding high-resolution images from the white square area inside the figure (a, c), respectively.



Number of grains: 263

Number of defects: 62

Figure S3 AFM image of $\text{PbI}_2/\text{CrOCl}$ heterostructure which deposited at room temperature (a) and annealed after deposited (b), the number of grain and defects are highlighted inside either.

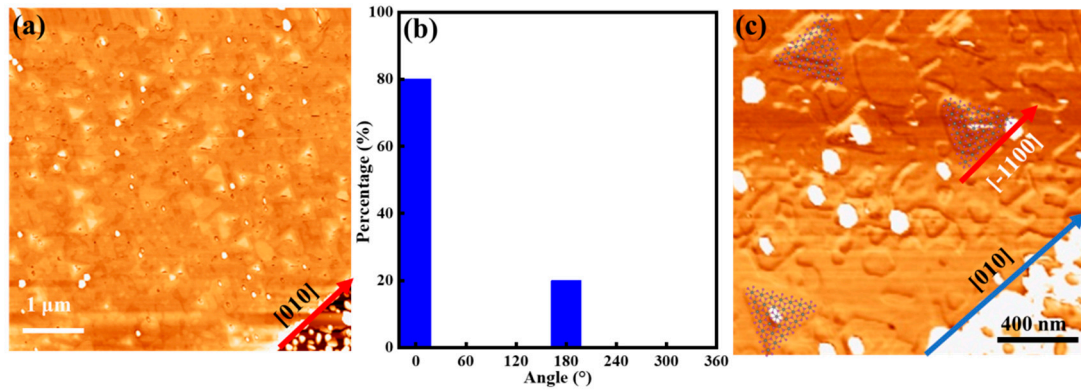


Figure S4 (a) AFM image of $\text{PbI}_2/\text{CrOCl}$ heterostructure deposited at 423 K, the triangular islands show the same orientation. (b) Statistical diagram of the orientation of PbI_2 triangular islands. (c) Phase image of $\text{PbI}_2/\text{CrOCl}$ heterostructure showing triangular islands, the $[\bar{1}100]$ direction of PbI_2 mostly along the $[010]$ direction of CrOCl nanoflake.

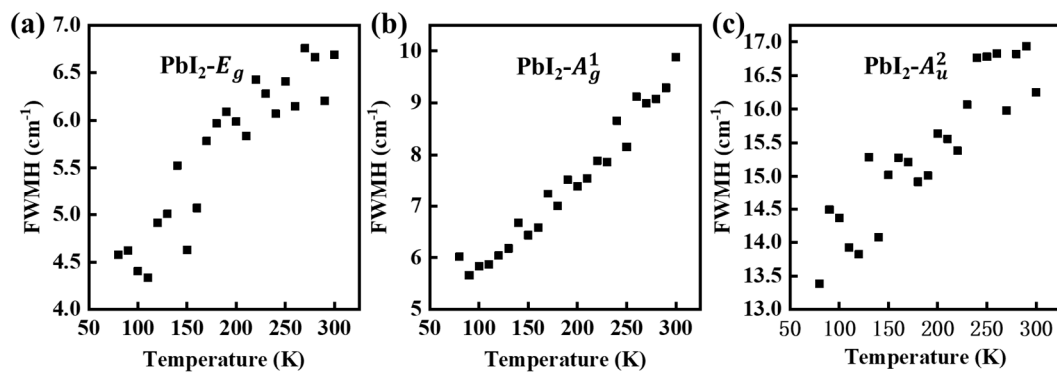


Figure S5 FWHM of E_g (a), A_g^1 (b) and A_u^2 (c) modes at temperature dependent Raman spectra. Each FWHM is linearly broadened as the temperature increasing.