

Thermal stability of 2D Bi₂O₂Se

High mobility, a suitable bandgap and good environmental stability are three essential requirements for 2D semiconductor's future development. Nevertheless, intensively investigated materials such as MoS₂ and black phosphorous can not meet these requirements at the same time. In 2017, an air-stable 2D Bi₂O₂Se with high mobility and large band gap appeared [1], which could be a highly competitive emerging 2D semiconductor material. However, its thermal stability which could restrict the processing technology and application fields has not been deeply studied.

We discovered that 2D Bi₂O₂Se could keep stable under the heating temperature of 290 °C in atmospheric environment. Water vapor did little effect to accelerate its oxidation, which means Bi₂O₂Se is insensitive to moisture. When the temperature became higher such as 340 °C, 2D Bi₂O₂Se was oxidized with a mild increase of thickness, but still remained a smooth surface. Good thermal stability of 2D Bi₂O₂Se is beneficial to expanding its future applications.

References

- [1] J. Wu, et al. Nature nanotechnol., 12 (2017) 530.

Figures

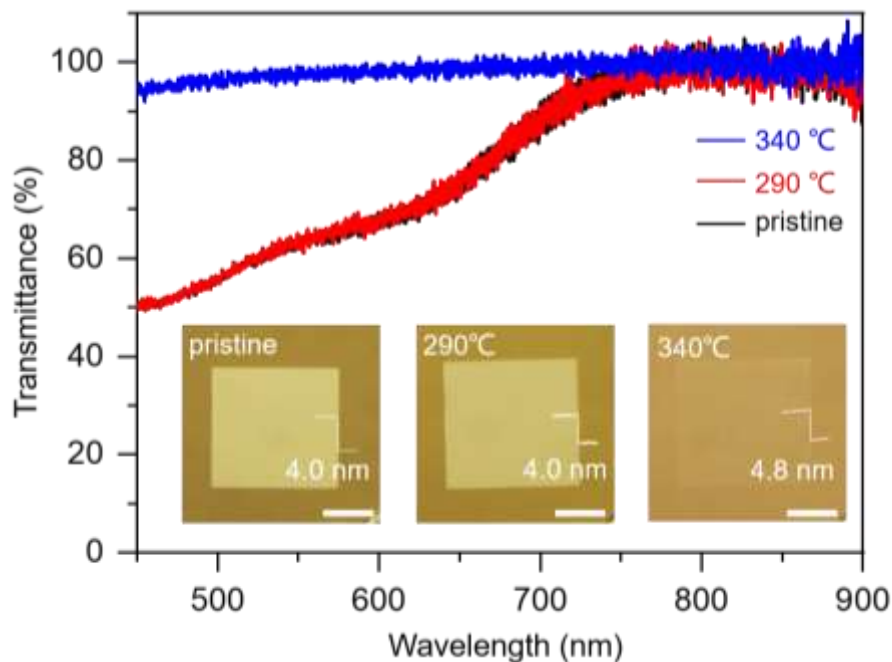


Figure 1: The optical images and transmittance curves of 2D Bi₂O₂Se under different heating temperatures for 10 min.