

Supplementary Information

Modulation of Optical and Electrical Properties in Hexagonal Boron Nitride by Defects Induced via Oxygen Plasma Treatment

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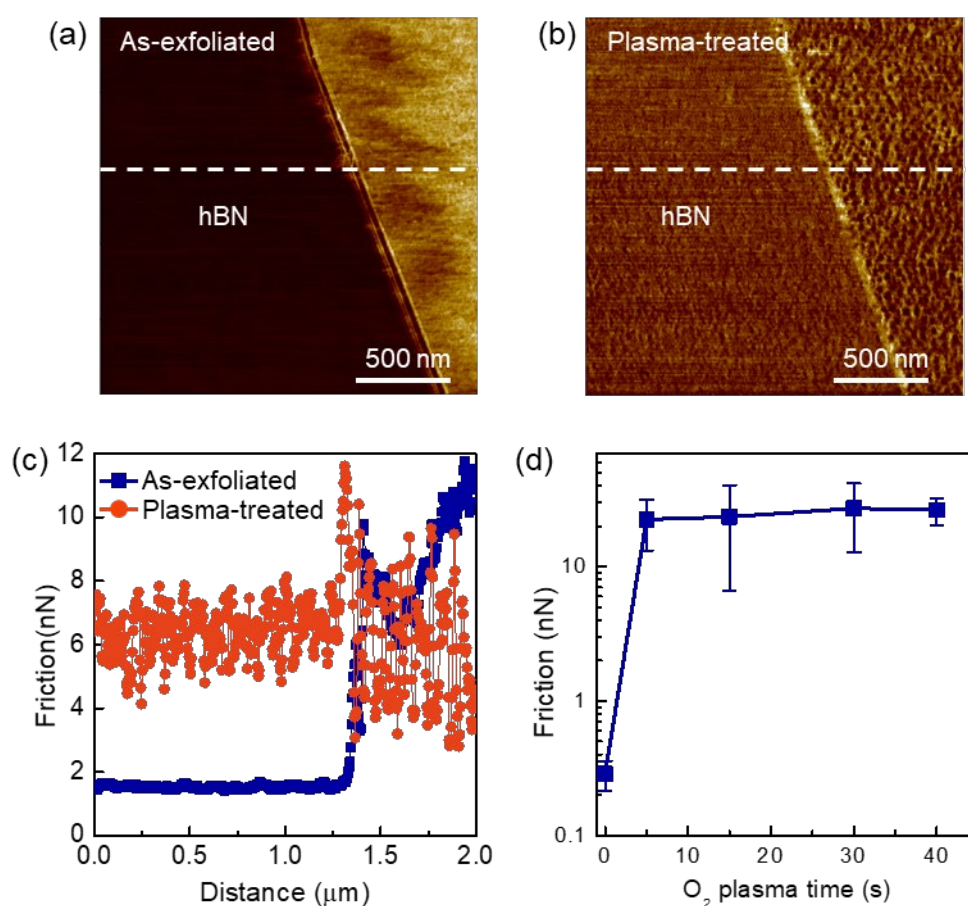


Figure S1. (a,b) Friction image of as-exfoliated and 14s plasma-treated hBN. (c) Profile of friction obtained along the white dashed line of (a,b), respectively. (d) Friction variation with oxygen plasma treatment time. The friction increases rapidly up to 6s of plasma treatment time and saturated above 6s.

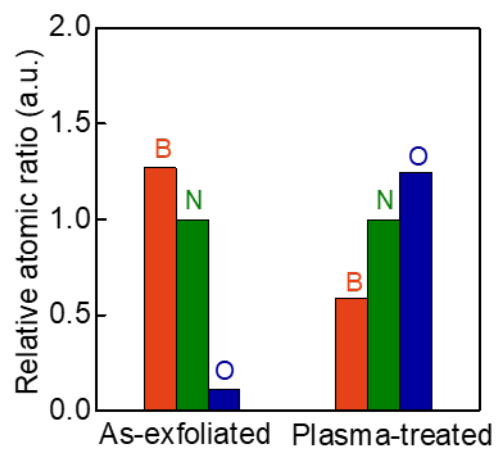


Figure S2. Relative atomic ratio of as-exfoliated and plasma-treated hBN. Atomic ration was calculated based on nitrogen. The boron relative atomic ratio of plasma-treated hBN decreased from 1.27 to 0.59. It means that boron is more easily removed by oxygen plasma than a nitrogen.

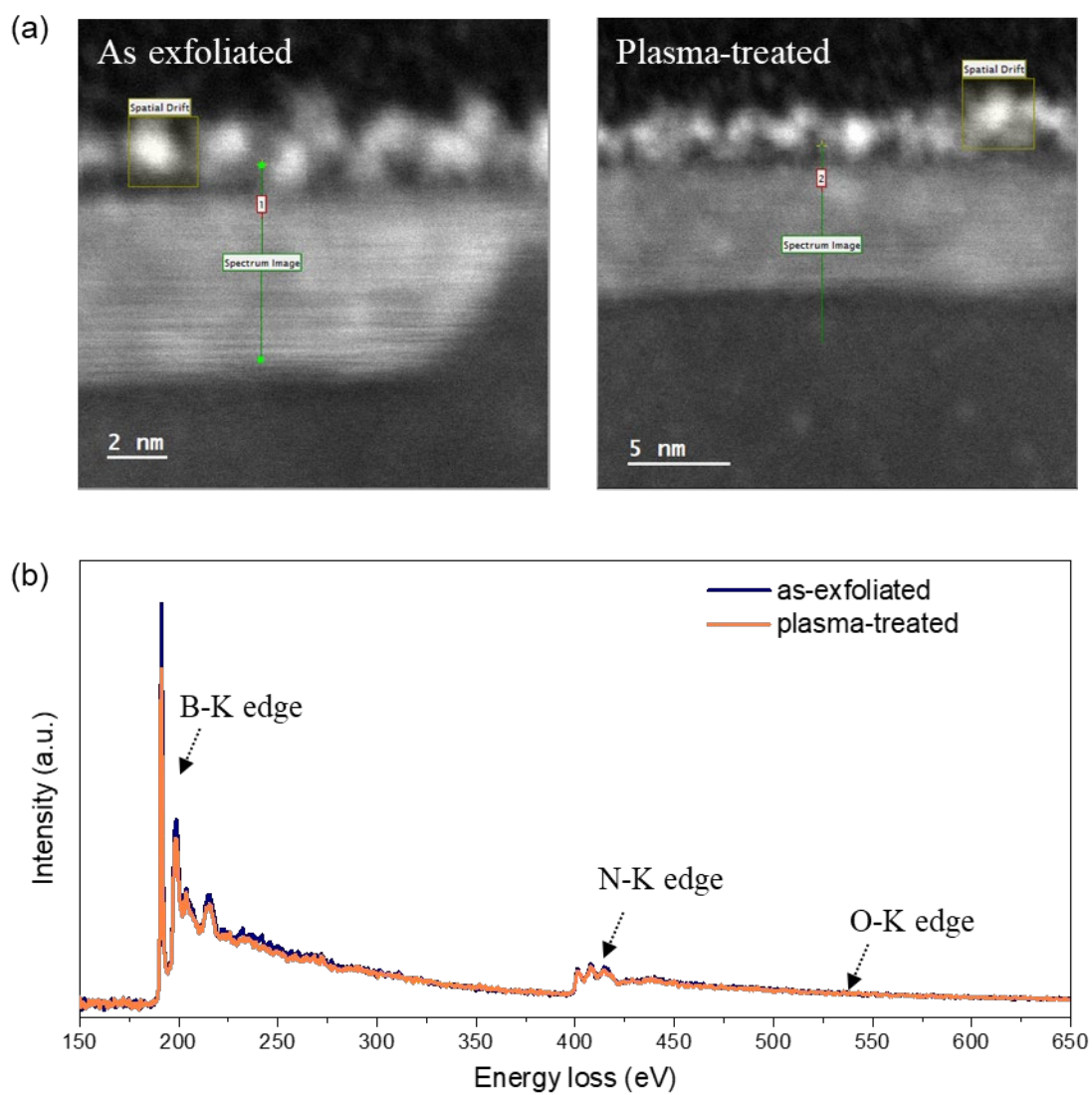


Figure S3. EELS analyses of the plasma-treated hBN. The Cs-STEM image (a) and EELS spectra (b) of the hBN before and after oxygen plasma. The blue and orange colored spectrums are as-exfoliated and plasma-treated of hBN, respectively.

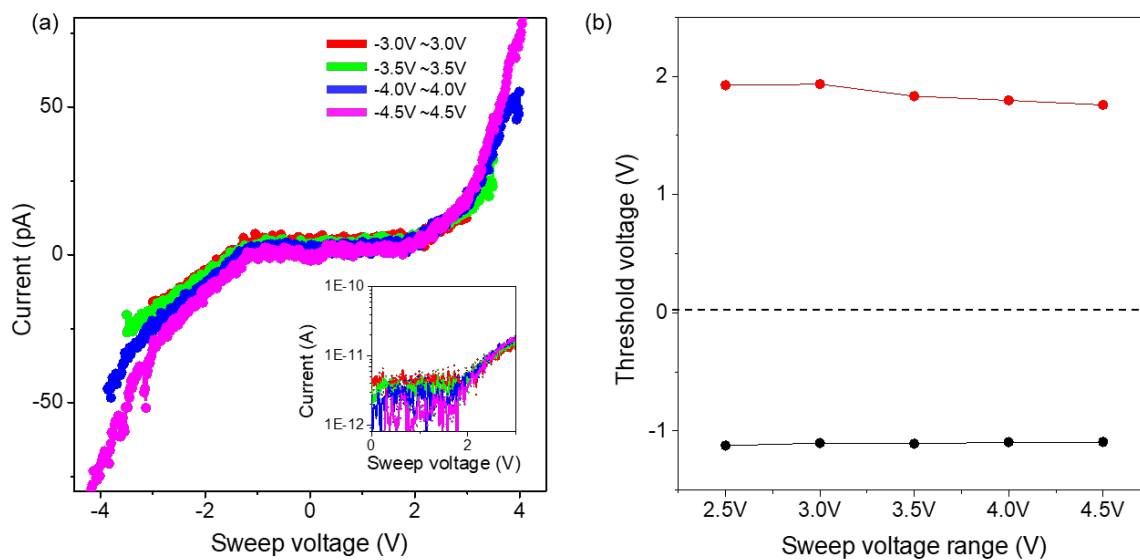
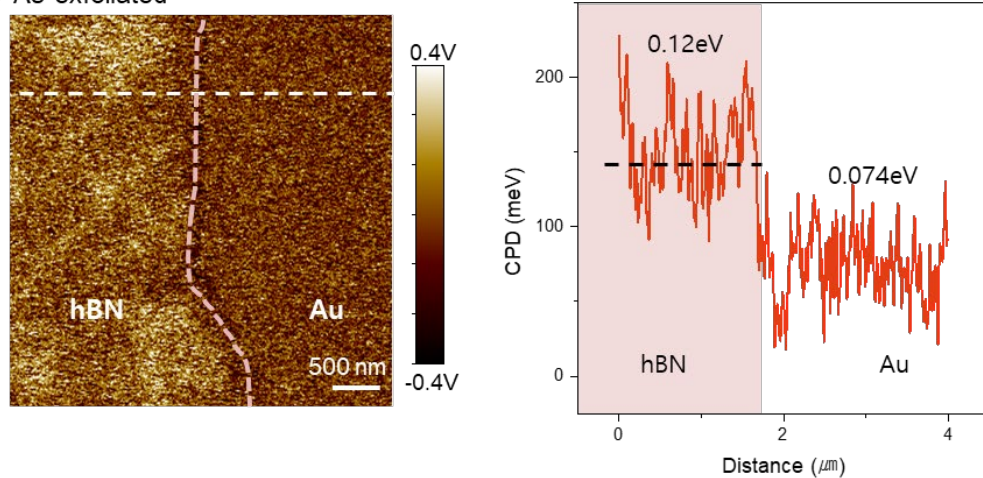


Figure S4. (a,b) Threshold voltage of plasma-treated hBN as a function of sweep voltage. Below the I/V conditions, oxygen plasma-treated hBN was not deformed by I-V spectroscopy, regardless of current detection

(a) As-exfoliated



(b) Plasma-treated

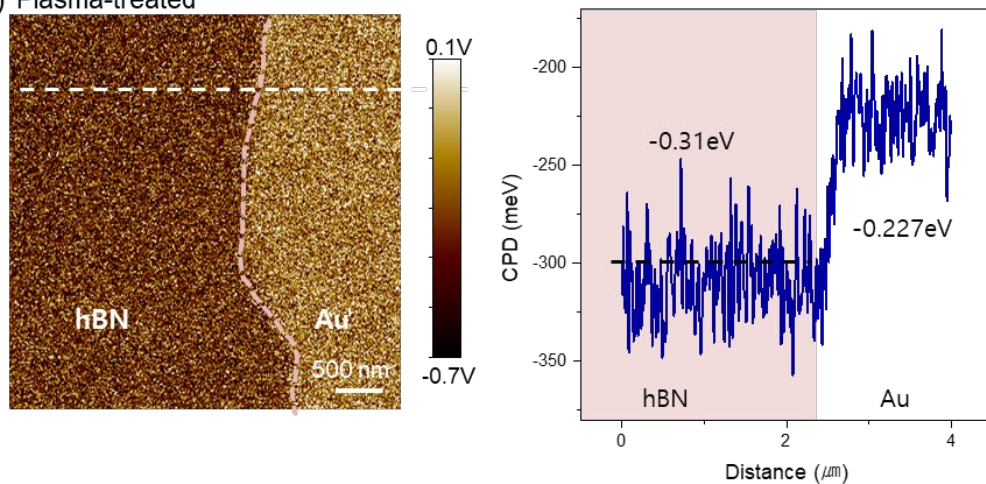


Figure S5 KPFM images and CPD of hBN flake before (a) and after (b) oxygen plasma. The CPD of the plasma-treated hBN demonstrates a remarkable reduction by ~ -0.31 eV. This shows the shift of the Fermi level of plasma-treated hBN.