Highly Selective Gas Sensor Based on WO$_3$/WS$_2$ Van Der Waals Heterojunction for 2-chloroethyl ethyl sulfide (2-CEES) Sensing Application

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Figure S1. The digital photographs of the four sensors based on (a) S-400, (b) S-450, (c) S-500 and (d) S-600.

Figure S2. The SEM images of (a) S-400, (b) S-450 and (c) S-600.
Figure S3. The characterization of WS$_2$ raw material. (a) TEM image, (b) SAED, (c) HRTEM image and (d-f) STEM image and corresponding elemental mapping images of the WS$_2$ raw material.

Figure S4. The characterization of S-600. (a) TEM image, (b) SAED, (c) HRTEM image and (d-f) STEM image and corresponding elemental mapping images of S-600.
Figure S5. The EDX spectrum of (a) WS$_2$ raw material and (b) S-600.

Figure S6. The response of sensors based on (a) S-400, (b) S-450, (c) S-500 and (d) S-600 to 5.7 ppm 2-CEES and acetone at different operating temperatures.

Figure S7. The dynamic transient response curves of sensors based on S-500 and S-600 to 5.7 ppm 2-CEES at operating temperature of (a) 200 °C and (b) 240 °C.
Figure S8. The thermal behavior of the prepared synthesized material (S-500).

Figure S9. The dynamic transient response curve of sensor to (a) DMMP, (b) acetone, (c) ammonia, (d) dichloromethane, (e) ethanol, and (f) acetonitrile with concentration of 5.7 ppm.