

## Supporting Information

### **Tailoring the electrical and Photo-electrical properties of WS<sub>2</sub> Field effect transistor by selective n-type chemical doping**

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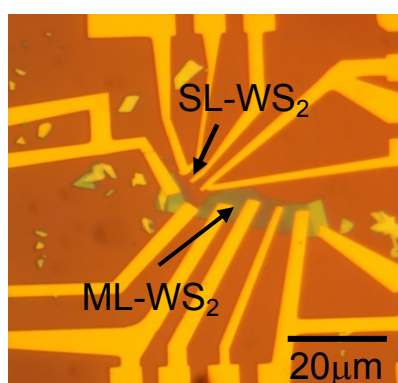
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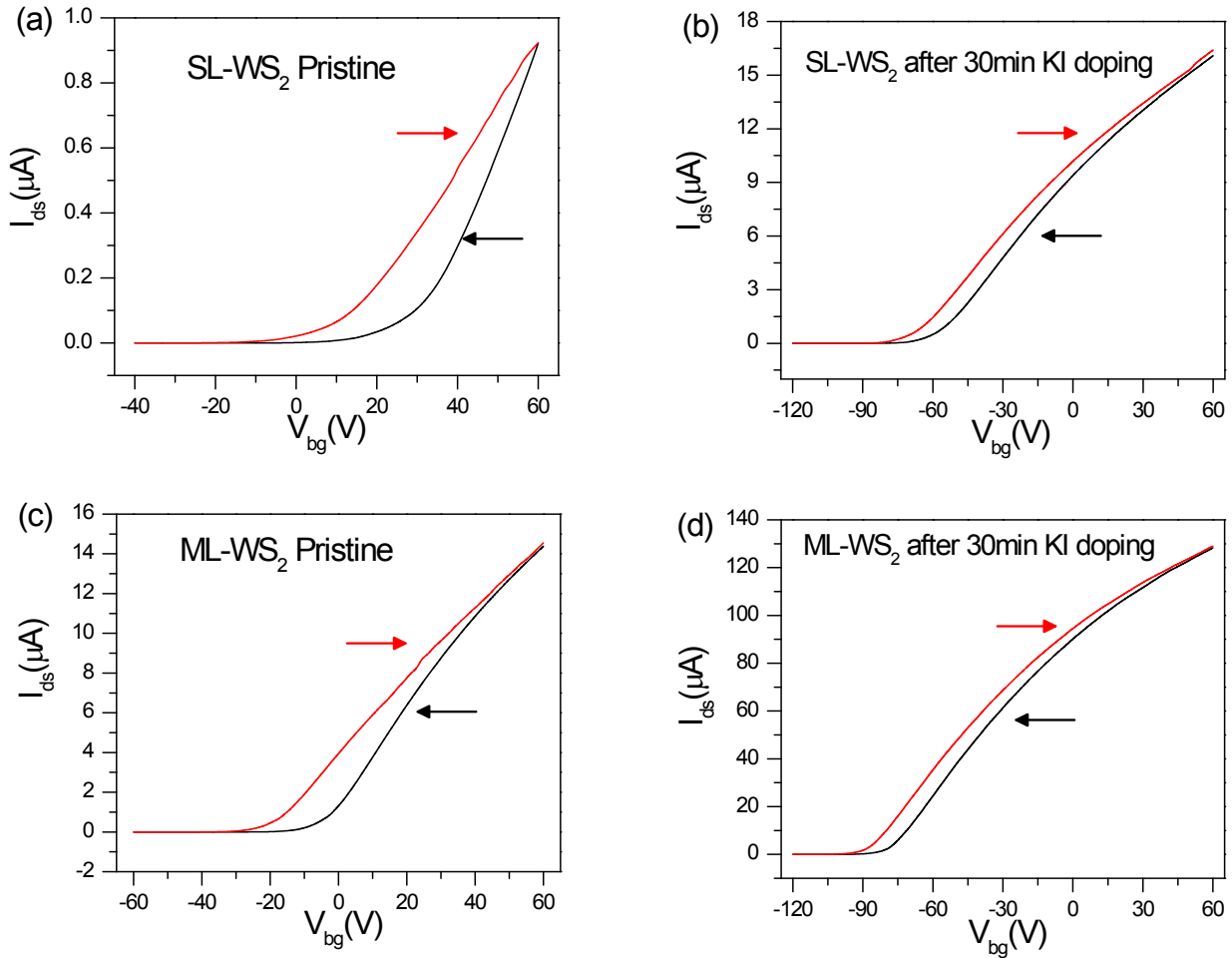
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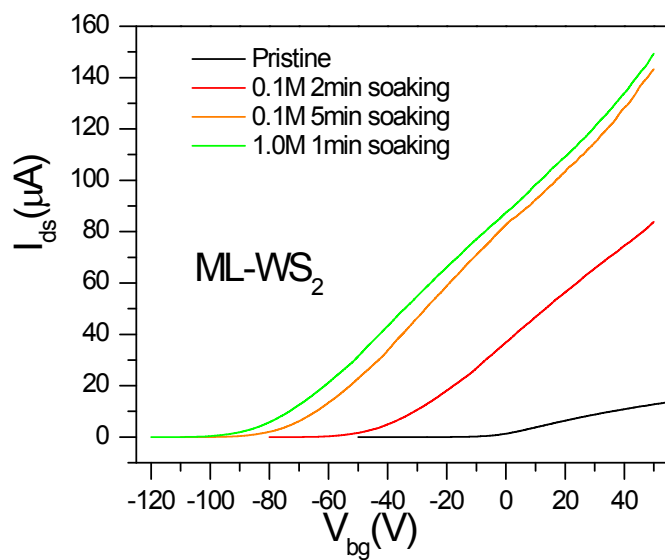
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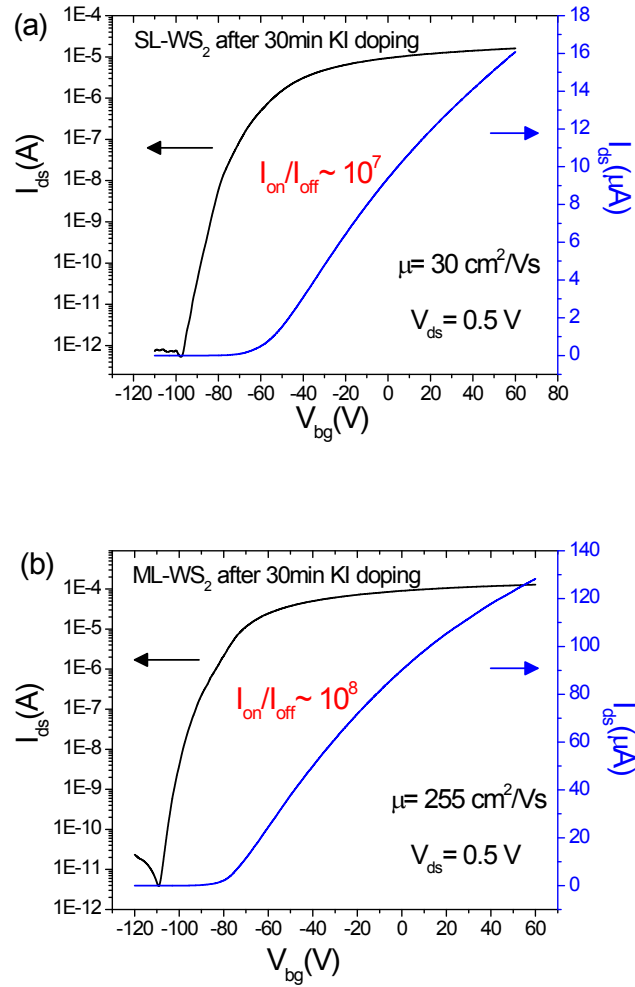
**Figure S1.** Optical image of mechanically exfoliated single-, multi-layer WS<sub>2</sub> films on Si/SiO<sub>2</sub> substrate with source-drain contacts.



**Figure S2.** (a) Transfer characteristics ( $I_{ds}$ - $V_{bg}$ ) of the SL-WS<sub>2</sub> FET on SiO<sub>2</sub> substrate before KI doping, where the back gate voltage was swept continuously from -40 to +60 V and then from +60 V to -40 V. (b) Transfer characteristics ( $I_{ds}$ - $V_{bg}$ ) of the SL-WS<sub>2</sub> FET on SiO<sub>2</sub> substrate after 30 min KI doping, where the back gate voltage was swept continuously from -120 to +60 V and then from +60 V to -120 V. (c) Transfer characteristics of the ML-WS<sub>2</sub> FET on SiO<sub>2</sub> substrate before KI doping. (d) Transfer characteristics of the ML-WS<sub>2</sub> FET on SiO<sub>2</sub> substrate after 30 min KI doping. All the measurements were performed in vacuum at room temperature.



**Figure S3.** Transfer characteristics ( $I_{ds}$ - $V_{bg}$ ) of ML-WS<sub>2</sub> FET for different treatment times and with concentration 0.1M and 1.0M of KI.



**Figure S4.** (a) Transfer characteristics ( $I_{ds}$ - $V_{bg}$ ) of the SL-WS<sub>2</sub> FET after 30 min KI doping, On/Off ratio of the device is  $\sim 10^7$ . (b) Transfer characteristics ( $I_{ds}$ - $V_{bg}$ ) of the ML-WS<sub>2</sub> FET after 30 min KI doping, On/Off ratio of the device is  $\sim 10^8$ .