Flexible Transition Metal Dichalcogenide Devices for Environmental Sensors and Energy Harvesting

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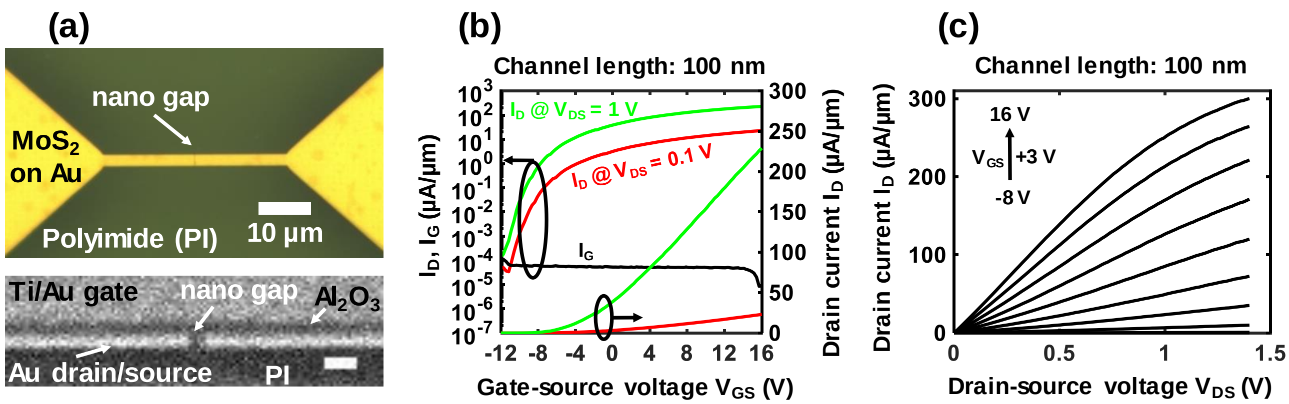

Fig. 1: Nanoscale MoS_2 field-effect transistors (FETs). **(a)** Optical microscope image (top) and cross-section scanning electron microscope (SEM) image (bottom, scale bar: 200 nm). Transfer **(b)** and output **(c)** characteristics of an MOS_2 FET with a channel length of 100 nm.

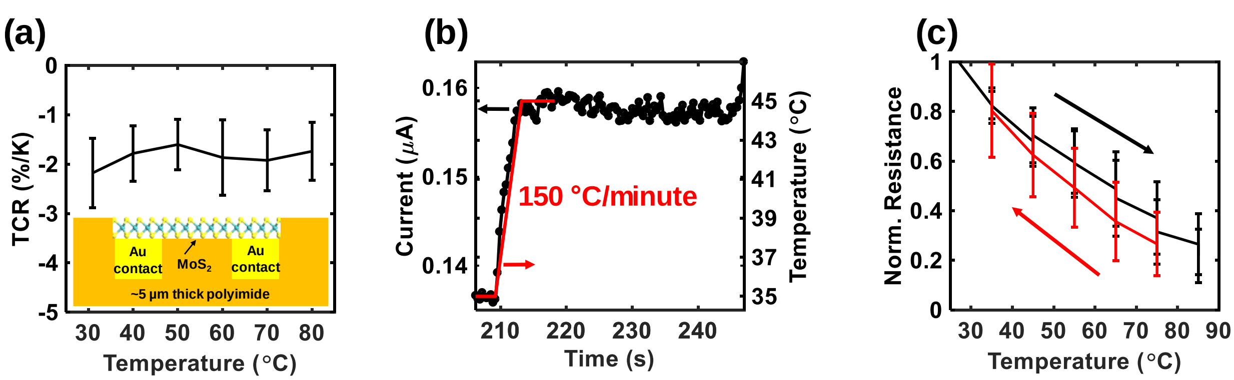

Fig. 2: Flexible monolayer MoS_2 temperature sensors on ~5 µm thick polyimide. **(a)** Differential temperature coefficient of resistance (TCR) averaged over 5 sensors between 30 °C and 80 °C. Inset: Schematic cross-section. **(b)** Real-time response of the sensor. Note: 150 °C/minute is the limitation of the heater stage. **(c)** Normalized resistance averaged over 5 sensors showing reversible resistance change.

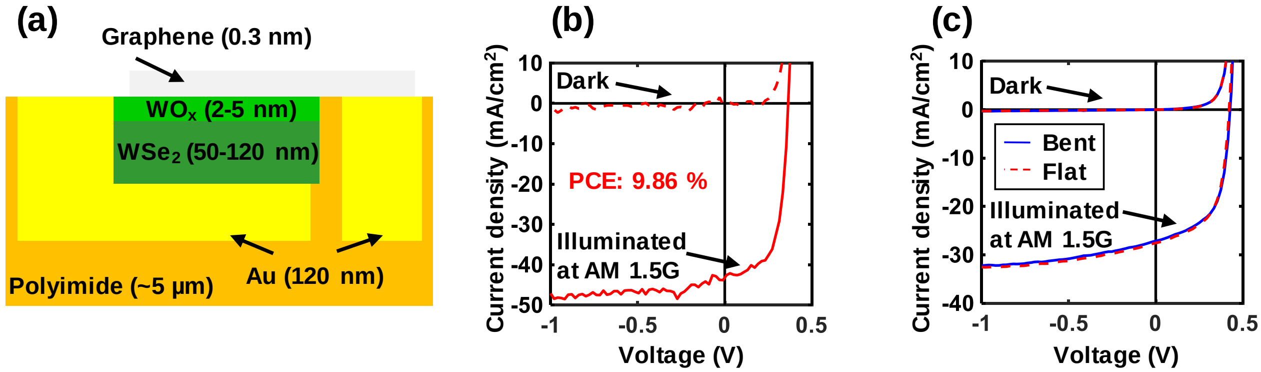

Fig. 3: Flexible WSe_2 solar cell on ~5 µm thick polyimide. **(a)** Schematic cross-section **(b)** Current density (J) versus voltage (V) in the dark and under AM 1.5G illumination showing a short-circuit current $J_{sc} \approx 43$ mA/cm^2, an open-circuit voltage $V_{oc} \approx 0.35$ V, a fill factor FF ≈ 63% and a power conversion efficiency PCE ≈ 10%. **(c)** J-V characteristic in flat condition and under tensile bending to a radius of 4 mm.