

Supporting information for

Electro-Thermally Induced Highly Responsive and Highly Selective Vanadium Oxide Hydrogen Sensor based on Metal-insulator Transition

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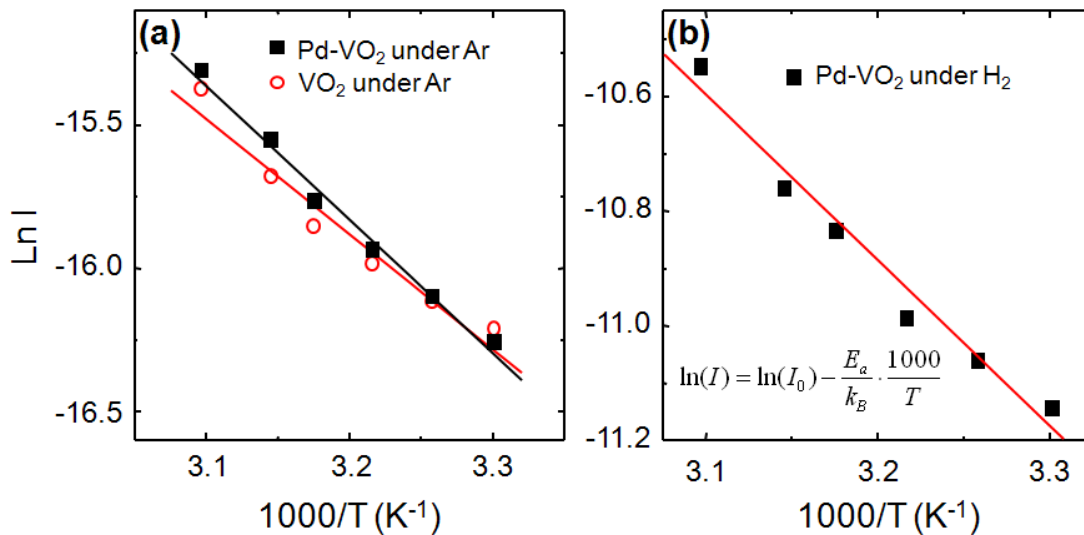


Figure 1S. Plots of $\ln I$ vs. $1000/T$ of VO_2 under Ar, Pd-VO_2 under Ar and H_2 .

Table 1S. Dimension, electrical and thermal conductivity of VO₂ nanowire and SiO₂ substrate.

VO ₂ nanowire dimension W×H×L [μm]	0.10 × 0.07 × 20.0
SiO ₂ substrate dimension W×H×L [μm]	100 × 100 × 100
Current density of nanowire J [A/cm ²]	0.5×10 ⁴ , 1.0×10 ⁴ , 2.0×10 ⁴ , 3.5×10 ⁴
Thermal conductivity of nanowire k _n [W/(m·K)]	5.10
Thermal conductivity of substrate k _s [W/(m·K)]	1.05
Applied voltage E _{app} [V]	5.0
Ambient and Initial Temperatures [°C]	45.0

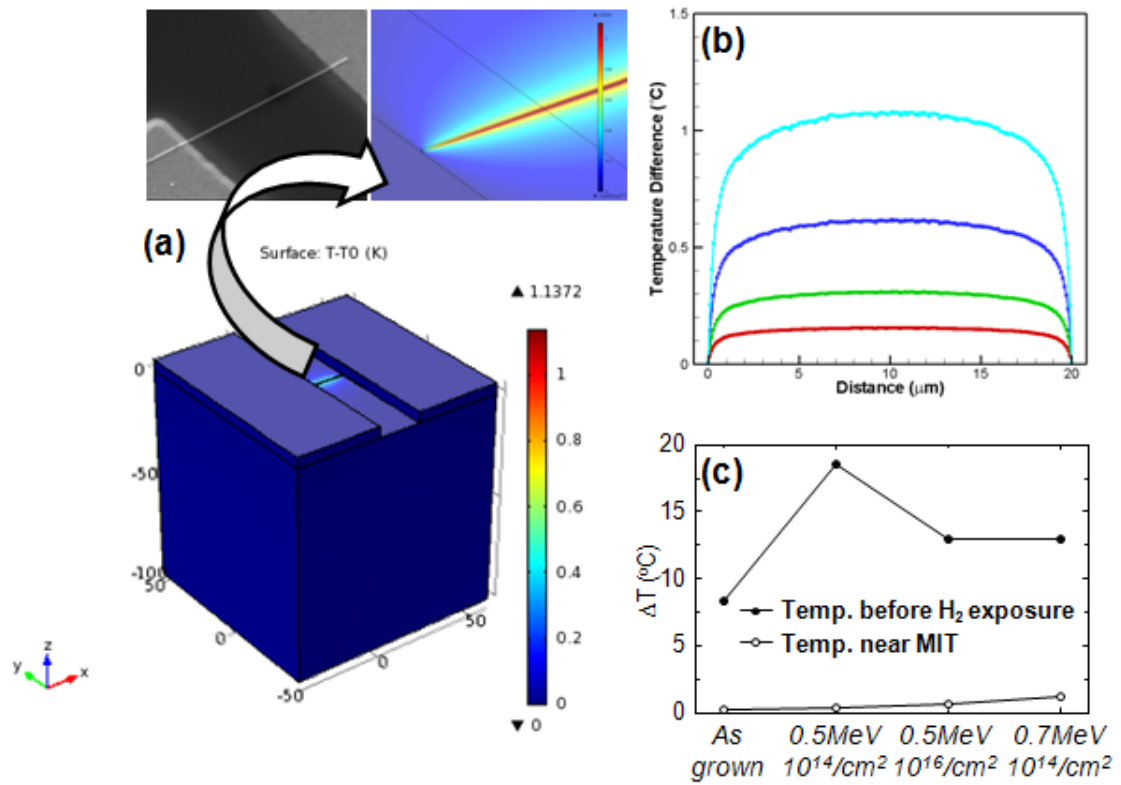


Figure 2S. (a) 3D model in COMSOL of a VO₂ nanowire (lateral dimension: 70 × 100 nm) on a SiO₂/Si substrate (Inset shows the SEM image of the VO₂ nanowire) (b) Plots of ΔT versus distance along the axis of the nanowire shown in (a) measured at 5 V as a

function of e-beam irradiation power and dose. (c) temperature difference of nanowires before H₂ exposure and near MIT as a function of e-beam irradiation power and dose.

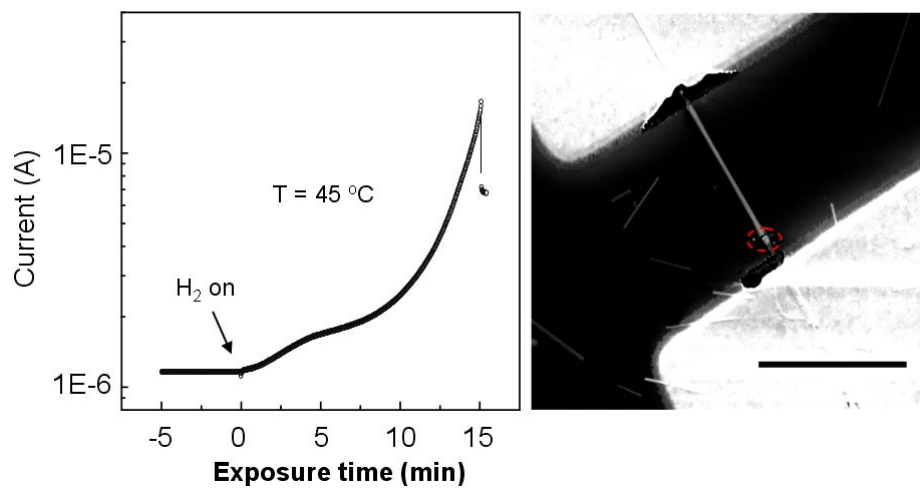


Figure 3S. *I-V* curve and SEM image of Pd-VO₂ after e-beam irradiation at 0.7 MeV.