Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Dispersed VO_2 phases in flexible sensor for recognizing tensile and compressive stress

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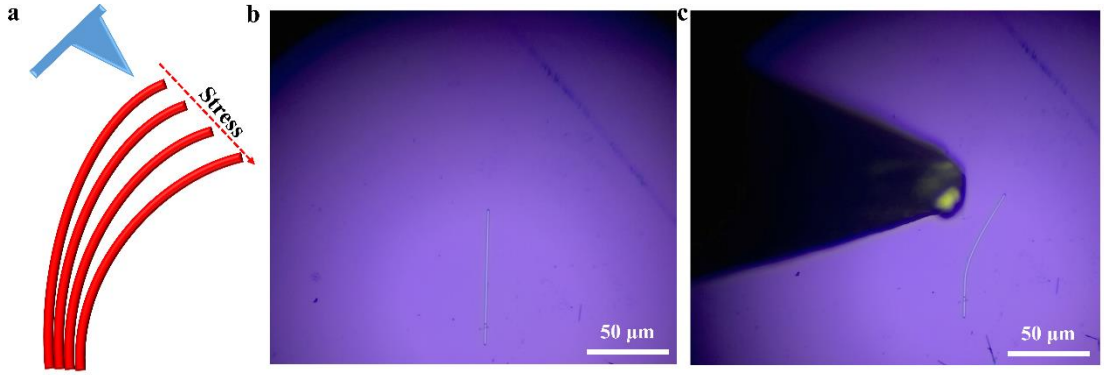

Figure S1 a) Schematic diagram of bent VO_2 MW. Optical micrographs of the as-grown VO_2 MW b) before and c) after bending.

The VO_2 MWs were deposited on SiO_2/Si substrate and the length was in about 100 μm while the width was around 1~2 μm. The weak binding between substrate and microwires was favorable for us to carry out bending experiments in situ.

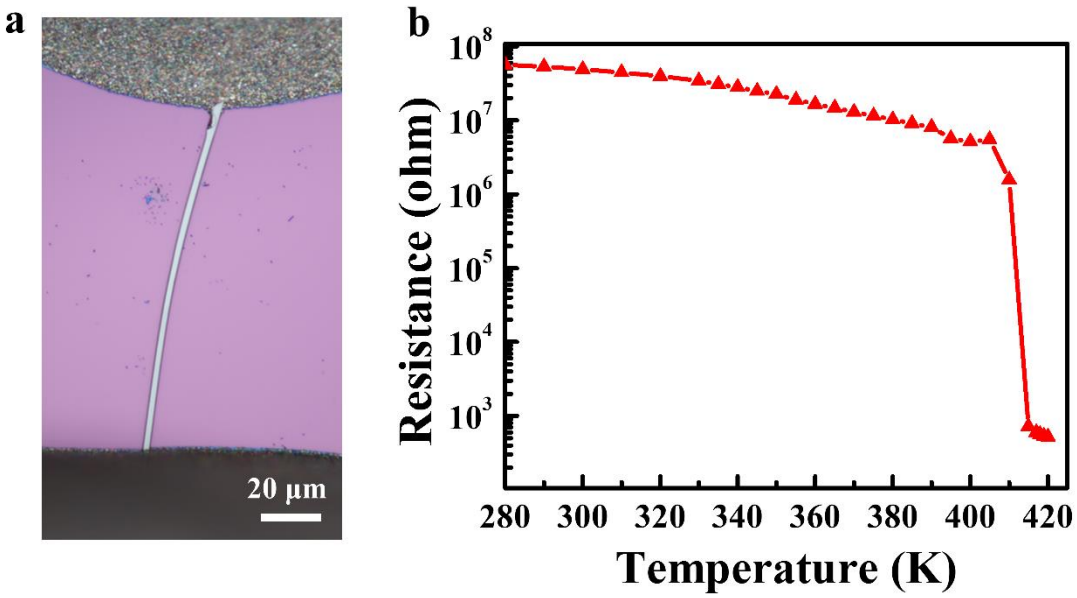

Figure S2. a) Optical micrographs of the bent VO_2 MW. b) Temperature dependence of the resistance of the bent VO_2.

Figure S2 shown the MIT characteristics of the bent VO_2 MW. The magnitude of resistance change was about 10^5 with a transition temperature of 410 K.

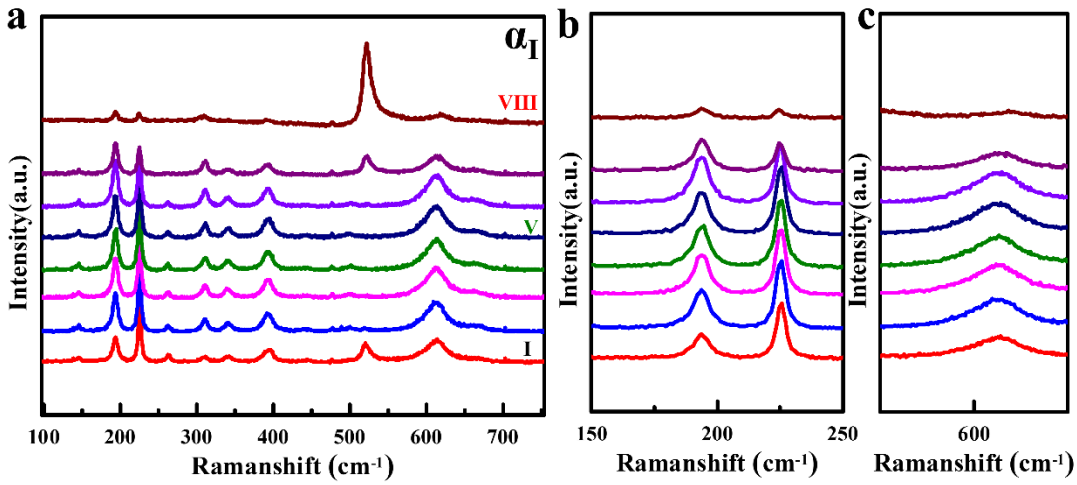

Figure S3 a) Raman spectra of the domain α. The enlarged Raman spectra of selected wavenumbers of b) 150 cm^{-1} to 250 cm^{-1} and c) 550 cm^{-1} to 650 cm^{-1}.

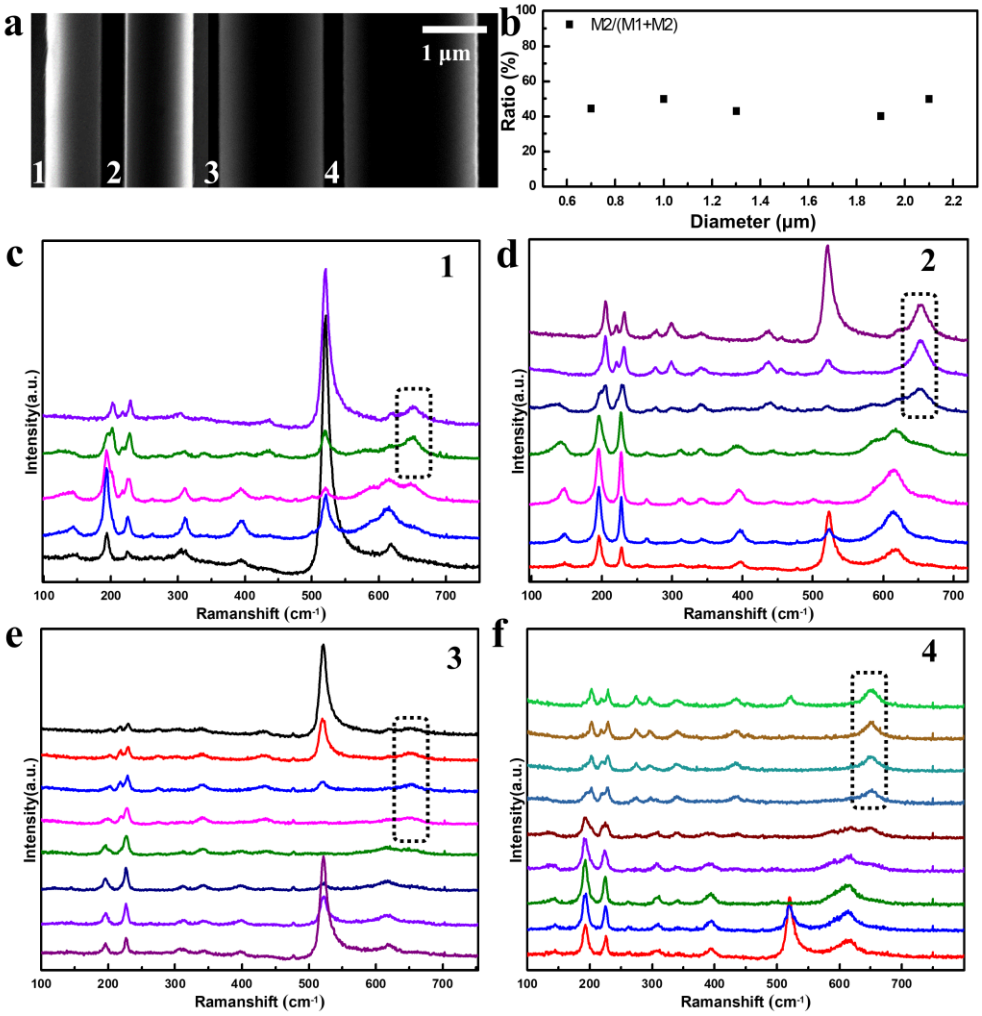

Figure S4 a) SEM images of the bent VO_2 MWs with different radii marked as 1 (0.7 μm), 2 (1μm), 3 (1.3 μm), 4 (1.9 μm). b) Relationship between the ratio of M2/(M1+M2) and the diameter of microwires. c-d) Raman spectra of the bent VO_2 MWs with radius of 1) 0.7 μm, 2) 1 μm, 3) 1.3 μm, 4) 1.9 μm. The black frame represents the Raman vibration mode of VO_2 of M2 phase.

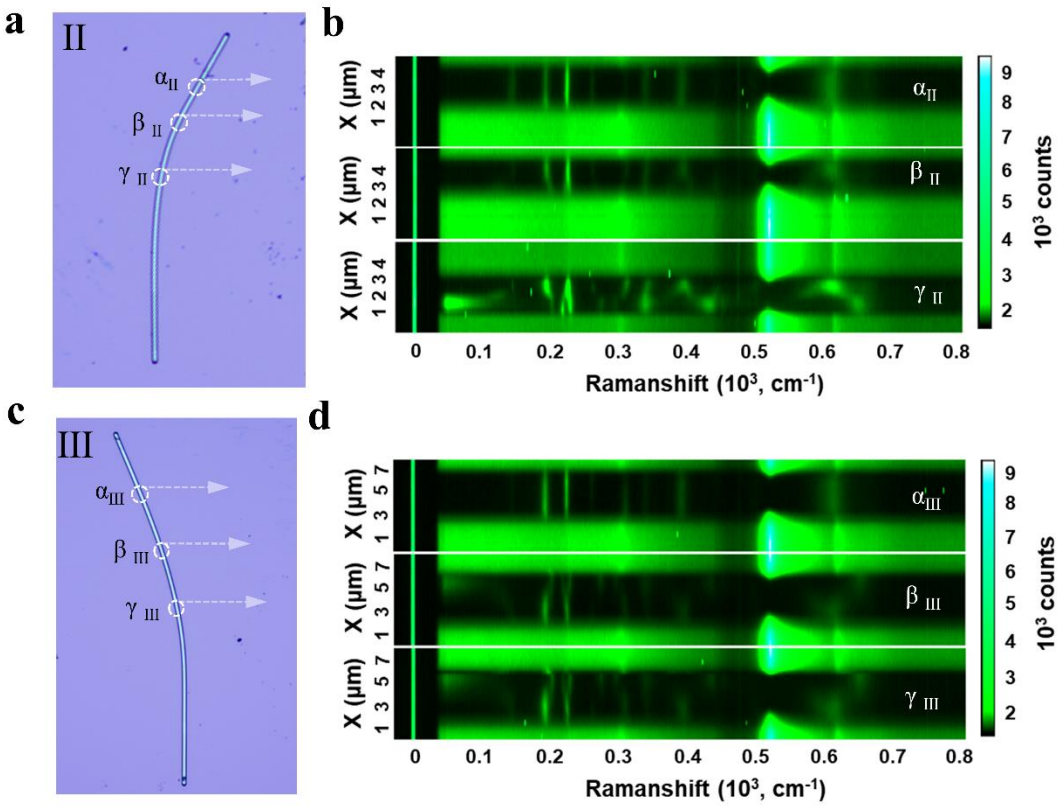

Figure S5 a, c) Optical micrograph of the VO_2 MW marked as II, III respectively. Three domains marked as α_{II}, β_{II}, γ_{II} were selected according to the bending degree. The white arrow presented line scan direction. b, d) Line-scanned mapping of the Raman spectra of the bent VO_2-MW, corresponding to the three points in a, c) respectively.

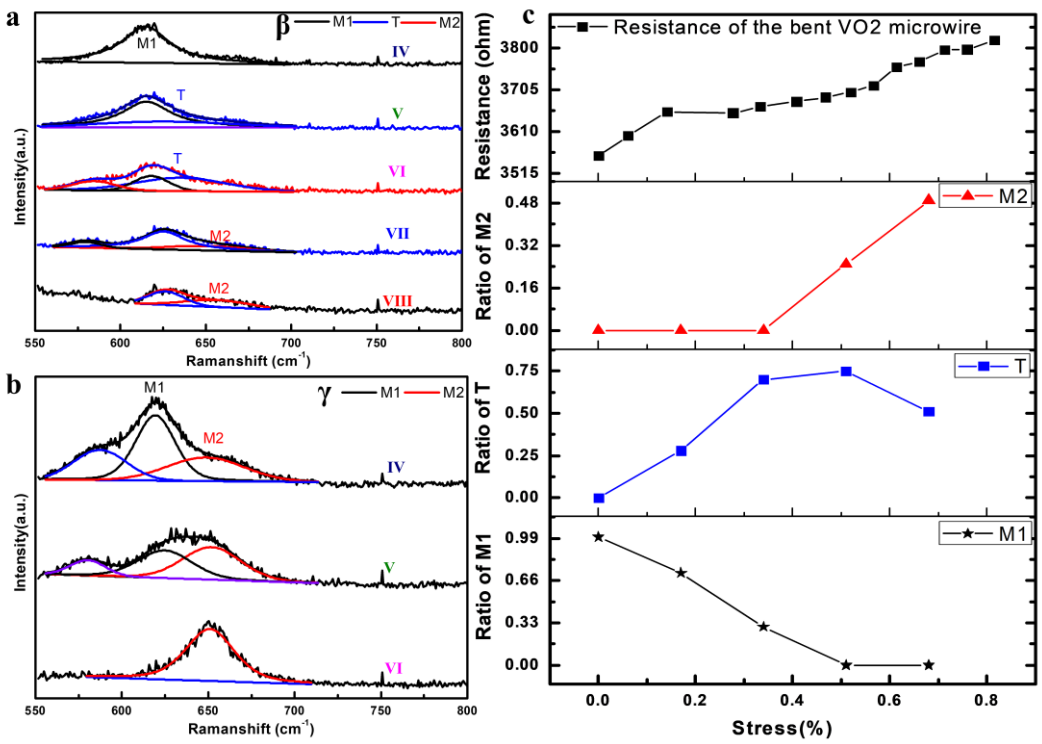

Figure S6 Raman spectra and fitting curve of mode ω_3 in a) domain β and b) domain γ. c) Relationship of the stress, resistance and phases.