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

Electronic Supplementary Information

Phase transition induced Raman enhancement on vanadium dioxide (VO_2) nanosheets

Peng Miao, [a] Jie Wu, [a] Yunchen Du, [a] Yanchun Sun*[b] and Ping Xu*[a]

[a] MIIT Key Laboratory of Critical Materials Technology for New Energy Conversion and Storage, School of Chemistry and Chemical Engineering, Harbin Institute of Technology, Harbin 150001, China. *Email: pxu@hit.edu.cn

[b] Heilongjiang River Fisheries Research Institute of Chinese Academy of Fishery Sciences, Laboratory of Quality & Safety Risk Assessment for Aquatic Products (Harbin), Ministry of Agriculture, Harbin 150070, China. *Email: sunyc2004@163.com

Supplementary Figures and Tables

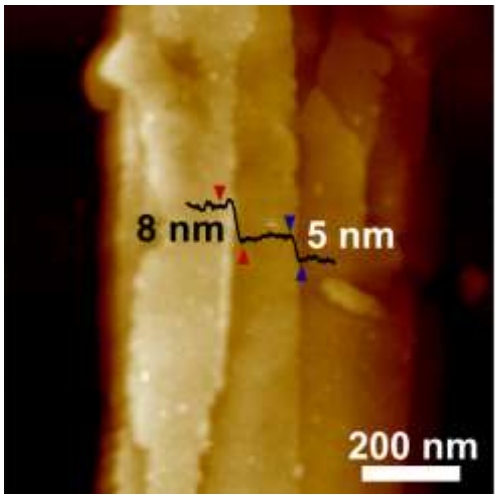

Fig. S1. AFM image of VO_2(B) nanosheets.

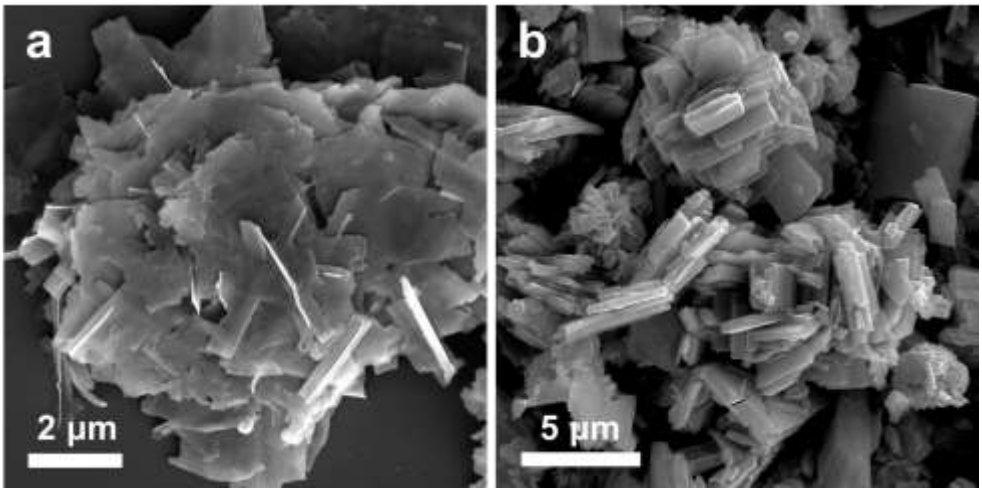

Fig. S2. SEM images of VO_2(B) nanosheets (a) and bulk (b) materials.

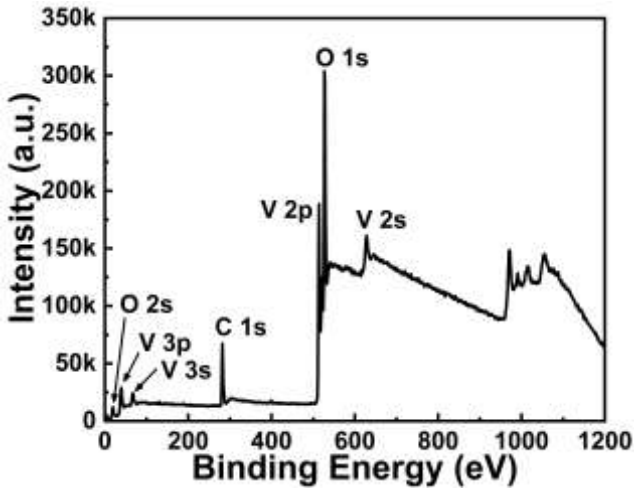

Fig. S3. Survey XPS spectrum of VO_2(B) nanosheets.

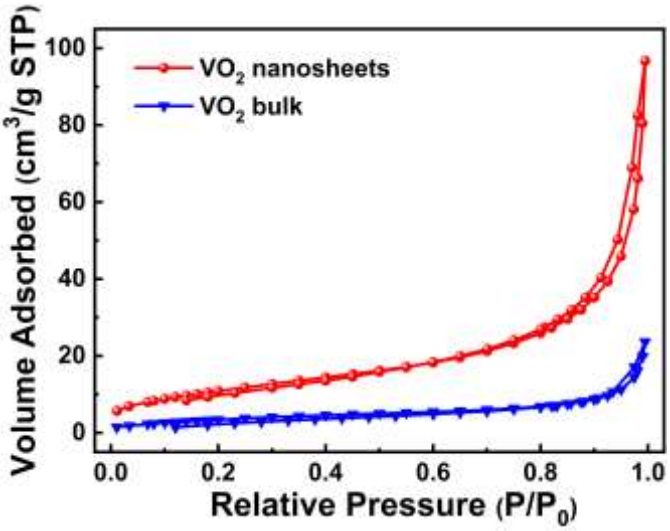

Fig. S4. N_2 adsorption-desorption isotherms of VO_2(B) nanosheets (red line) and VO_2(B) bulk material (blue line).

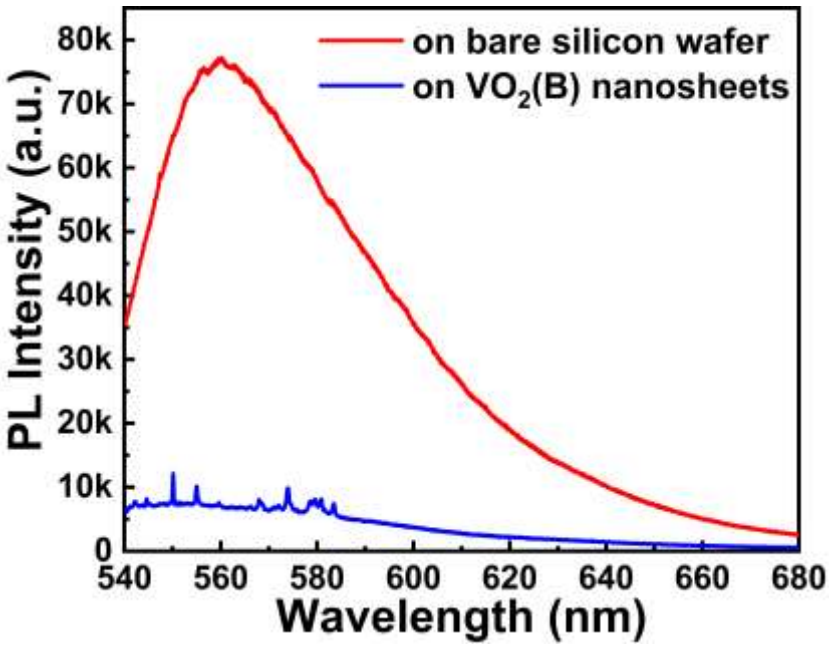

Fig. S5. Photoluminescence (PL) spectra of 10^{-6} M R6G on bare silicon wafer (red line) and on VO_2(B) nanosheets (blue line) under 532 nm laser excitation.

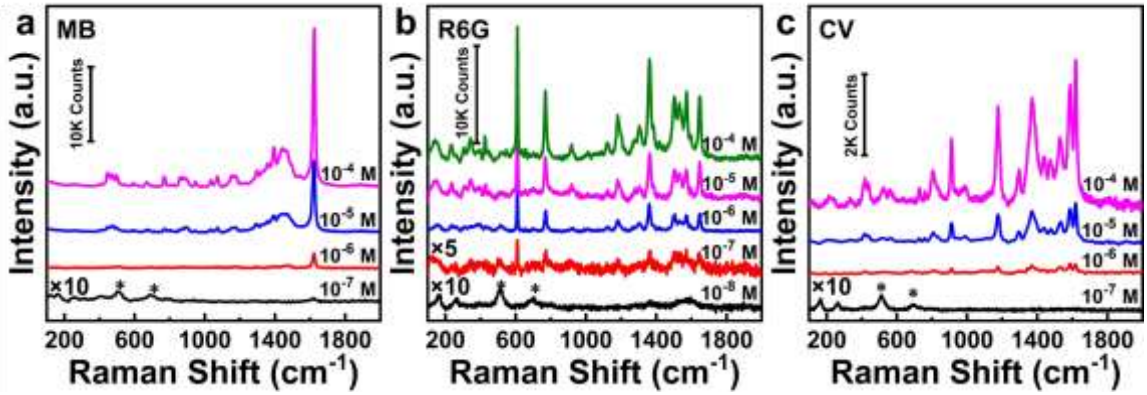

Fig. S6. Concentration-dependent SERS spectra of MB (a), R6G (b), and CV (c) on VO_2(B) nanosheet substrates under 532 nm laser excitation.

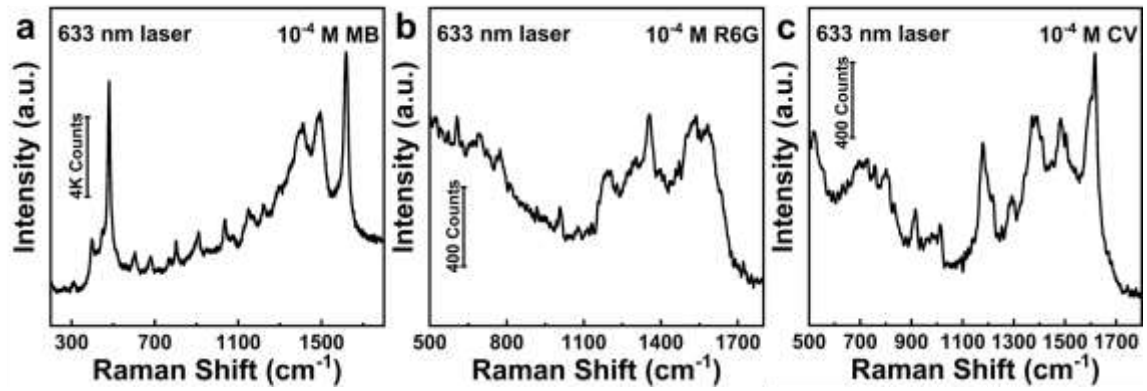

Fig. S7. Raman spectra of MB (a), R6G (b), and CV (c) on VO_2(B) nanosheet substrates under 633 nm laser excitation.

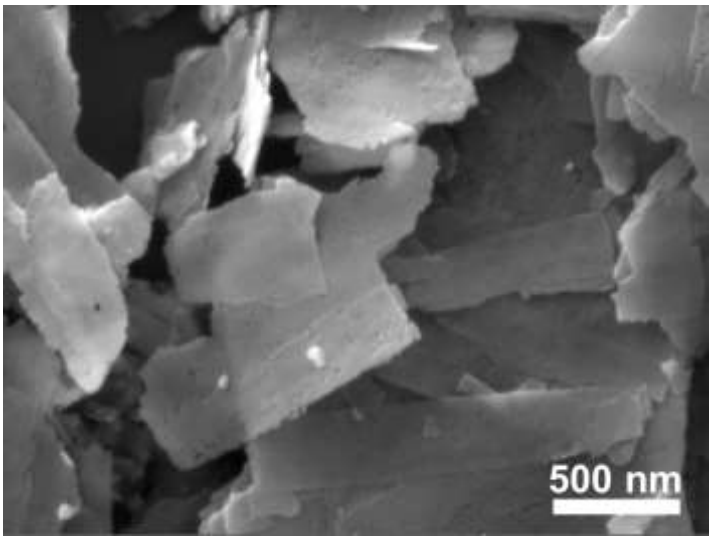

Fig. S8. SEM image of VO_2(M) nanosheets.

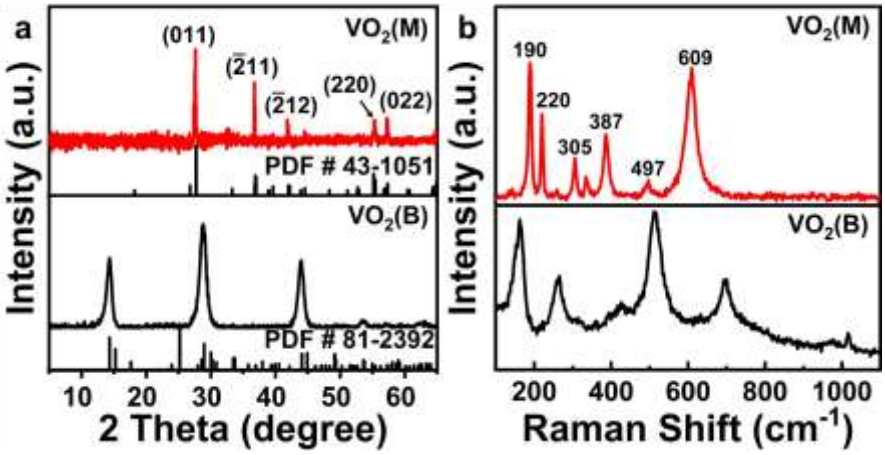

Fig. S9. XRD patterns (a), and Raman spectra (b) of the VO_2(B) nanosheets and VO_2(M) nanosheets.

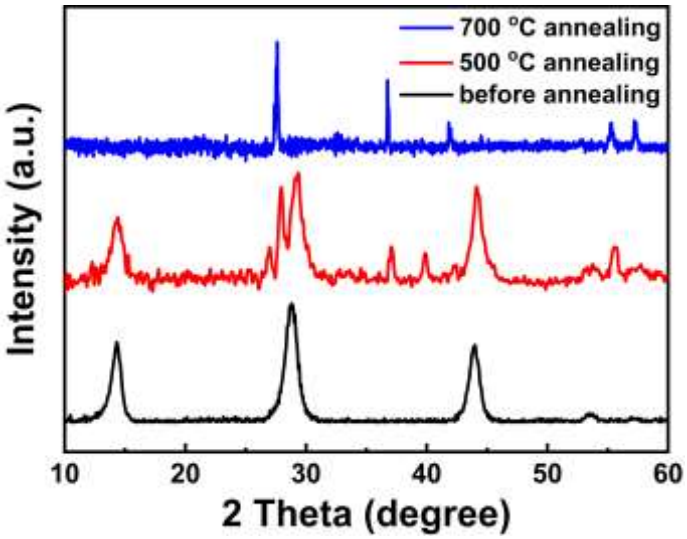

Fig. S10. XRD patterns of prepared VO_2(B) nanosheets with different annealing temperature. All samples were annealed at target temperature for 2 h in N_2 flow with a heating ramp of 10 ^oC min^{-1}.

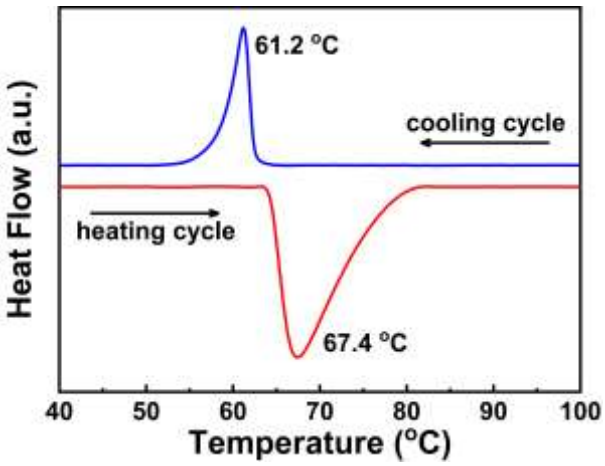

Fig. S11. DSC curves of VO_2(M) nanosheets obtained from the as-prepared VO_2(B) nanosheets by annealing at 700 °C for 2 h in N_2 flow with a heating ramp of 10 °C min^{-1}.

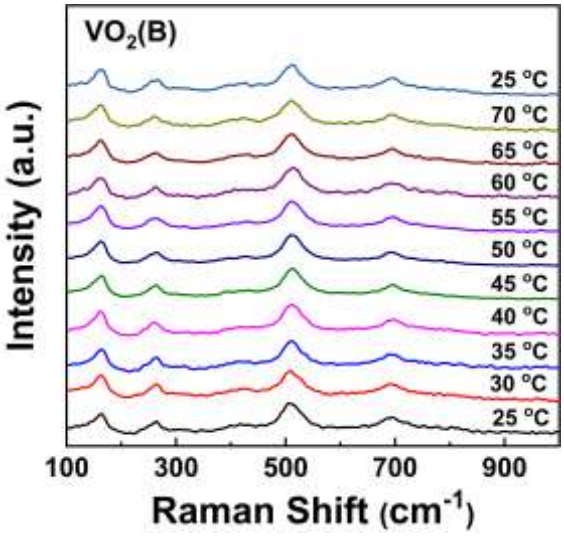

Fig. S12. Temperature-dependent Raman spectra of VO_2(B) nanosheets.

Table S1. XPS fit parameters for the V2p and O1s signals of the VO_2(B) nanosheets and VO_2(B) bulk materials.

Core line	VO_2(B) nanosheets				VO_2(B) bulk			
	BE (eV)	FWHM (eV)	Area (cts. eV/s)	%L-G	BE (eV)	FWHM (eV)	Area (cts. eV/s)	%L-G
$V^{5+}2p_{3/2}$	517.3	1.76	92798	42	517.3	1.86	85403	42
$V^{5+}2p_{1/2}$	524.5	2.87	42713	42	524.6	3.23	43380	42
$V^{4+}2p_{3/2}$	515.9	1.60	44094	26	516.0	1.64	65025	26
$V^{4+}2p_{1/2}$	523.2	2.86	21860	26	523.3	2.91	33423	26
O1s(VO_x)	530.0	1.38	129194	10	530.0	1.39	137423	10
$V^{5+}2p_{3/2sat}$	530.9	0.69	5814	0	530.9	0.76	9718	0
O1s-2	531.5	1.06	14368	0	531.5	1.02	19172	0
O1s-3	532.6	1.77	9516	0	532.6	1.96	21427	0