Electronic Supplementary Information

$MoO_3/TiO_2/Ti_3C_2T_x$ Nanocomposites based Gas Sensors for Highly Sensitive and Selective Isopropanol Detection at Room

Temperature

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Figure S1. (a) Schematic diagram of experimental device. (b) Schematic diagram of measuring resistance by DC voltage division method.

Liquid gas distribution formula:

Q= $(V \times C \times M)/(22.4 \times d \times \rho) \times 109 \times (273+TR)/(273+TB)$

In the formula: **Q** is the volume of liquid to be taken (mL); **V** is the volume of the test bottle (mL); **M** is the molecular weight of the substance (g); **d** is the purity of the liquid; **C** is the concentration of the gas to be prepared (ppm); ρ is the liquid density (g / cm³); **TR** is the test ambient temperature (°C); **TB** is the temperature in the test bottle (°C).

Calculation formula of limit of detection (LOD) and limit of quantitation (LOQ):

LOD=3R_{SD} /b, LOQ=10R_{SD}/b

In the formula: **b** is slope of calibration curve; R_{sD} is the standard deviation of R_s . In MTT3 work, R_{SD} =0.1009, LOD=50.45 ppb, LOQ=168.17 ppb.



Figure S2. X-ray diffraction patterns of MTT4, MTT5 and MTT6.



Figure S3. Nitrogen adsorption/desorption isotherms of MTT3 and Ti₃C₂T_x.



Figure S4. The high-resolution XPS spectra of (a) Ti 2p, (b) C 1s and (c) O 1s for $Ti_3C_2T_x$.



Figure S5. Response-recovery curves of (a) TiO₂/Ti₃C₂T_x, (b-f) MTT1-MTT5.



Figure S6. Response-recovery curves of MTT3 sensor to different gases, (a) acetone, (b) ammonia, (c) toluene, (d) methanol and (e) ethanol.



Figure S7. Response-recovery curve (a) and corresponding response value function curve (b) of 4 groups of MTT3 sensor to different concentrations of Isopropanol at room temperature and 50% relative humidity. Response-recovery curve (c) and corresponding response value function curve (d) of 8 groups of MTT3 sensor to different concentrations of Isopropanol at room temperature and 64% relative humidity.



Figure S8. UV–vis diffuse reflectance spectra of MXene Absorbance versus wavelength (a) and $(\alpha hv)^2$ versus hv plots (b).