Flexible Transparent Colorimetric Wrist Strap Sensor

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Fig. S1 SEM image of PDA film on PET.

Fig. S2 The HRTEM and FFT pattern images of MoS$_2$ nanosheets (A) and PDA/MoS$_2$ (B).
Fig. S3 EDS spectra of MoS$_2$ (A) and PDA/MoS$_2$ (B).

Fig. S4 FTIR of MoS$_2$, PDA, and PDA/MoS$_2$ composite.

Fig. S5 UV-vis spectra of PDA, and PDA/MoS$_2$ films.
**Fig. S6** Transmittance spectra of PDA, PDA/MoS$_2$-1, PDA/MoS$_2$-2, PDA/MoS$_2$-3, and PDA/MoS$_2$-4 films after exposed to DMF vapor.

**Fig. S7** UV-vis spectra of PDA/MoS$_2$-4 in the absence and presence of DMF vapor.

**Fig. S8.** UV-vis spectra of PDA/MoS$_2$ film exposed to NH$_3$ (A, B, C), NO$_2$ (D, E, F), and
C$_2$H$_8$N$_2$ (Ethylenediamine) (G, H, I). The concentrations of NH$_3$ and C$_2$H$_8$N$_2$ were 0.5%, 1%, and 4%. The concentrations of NO$_2$ were 0.01%, 0.02%, and 0.1%.

We have conducted the detection of N-containing gas species including NH$_3$, NO$_2$, C$_2$H$_8$N$_2$ (Ethylenediamine) using PDA/MoS$_2$ film sensor. The detecting procedures were the same with that for DMF vapor. It was found that no obvious color changes were observed. The UV-vis spectra of PDA/MoS$_2$ film before and after exposed to gases were collected. Figure S8 indicated that PDA/MoS$_2$ film showed CR value less than 6% for NH$_3$, NO$_2$, and C$_2$H$_8$N$_2$. As proven by previous research, the colorimetric transition of PDA was generally ascribed to the deformation of PDA side chains by the interaction with suitable organic solvents (Davis, B. W.; Burris, A. J.; Niammont, N.; Hare, C. D.; Chen, C.-Y.; Sukwattanasinitt, M.; Cheng, Q., Langmuir 2014, 30, 9616-9622). For NH$_3$, NO$_2$ gases, and C$_2$H$_8$N$_2$, despite of their affinity to MoS$_2$, their weak interaction with PDA failed to induce the color change of PDA.