

Single-stranded DNA-Functionalized Single-Walled Carbon Nano-tubes Gas Biosensor Arrays for the Detection of Volatile Organic Compounds Biomarker released by the Huanglongbing Disease infected Citrus tree

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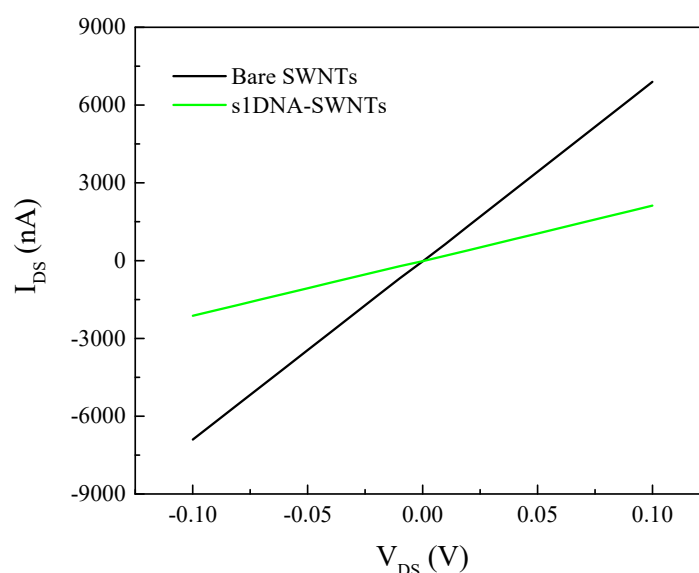


Figure 1. I_{DS} - V_{DS} characteristics of SWNTs before and after functionalization with s1DNA at $V_G=0$ V.

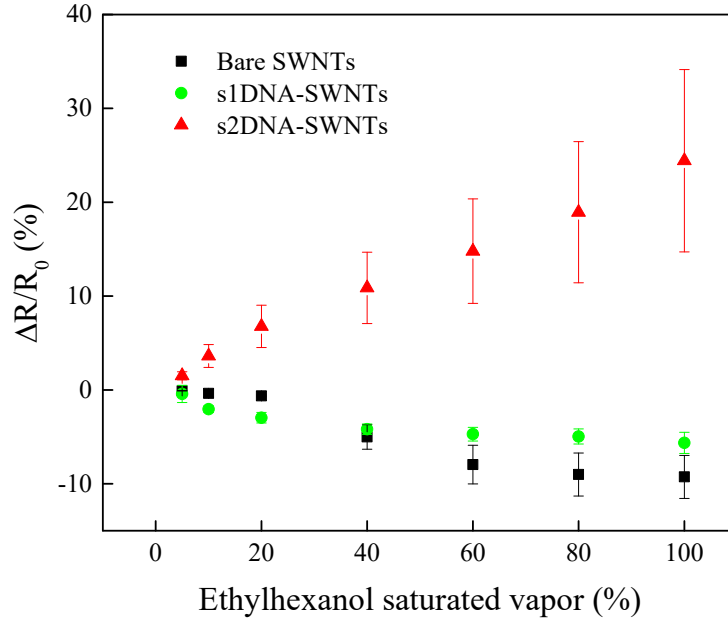


Figure 2. Calibration curves of bare and ssDNA coated SWNTs sensor towards different concentrations of ethylhexanol vapors performed at $V_{DS}=0.1$ V.

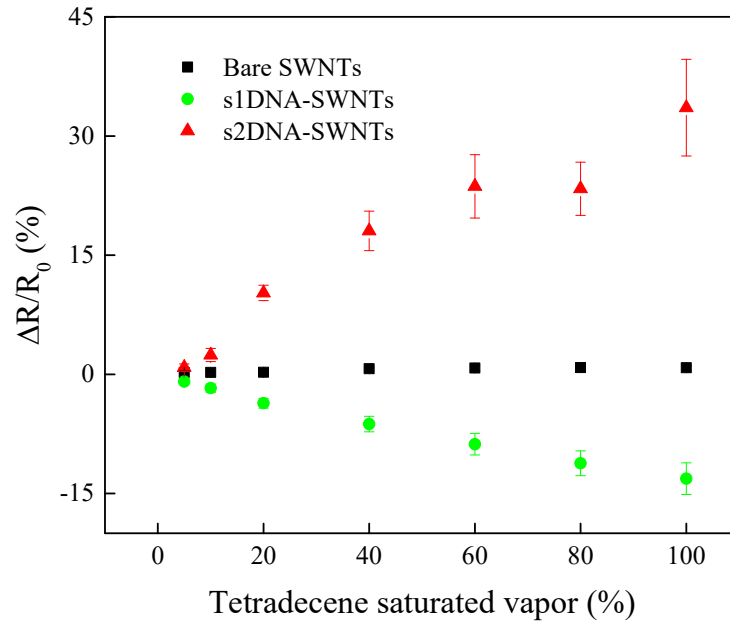


Figure S3. Calibration curves of bare and ssDNA coated SWNTs sensor towards different concentrations of tetradecene vapors performed at $V_{DS}=0.1$ V

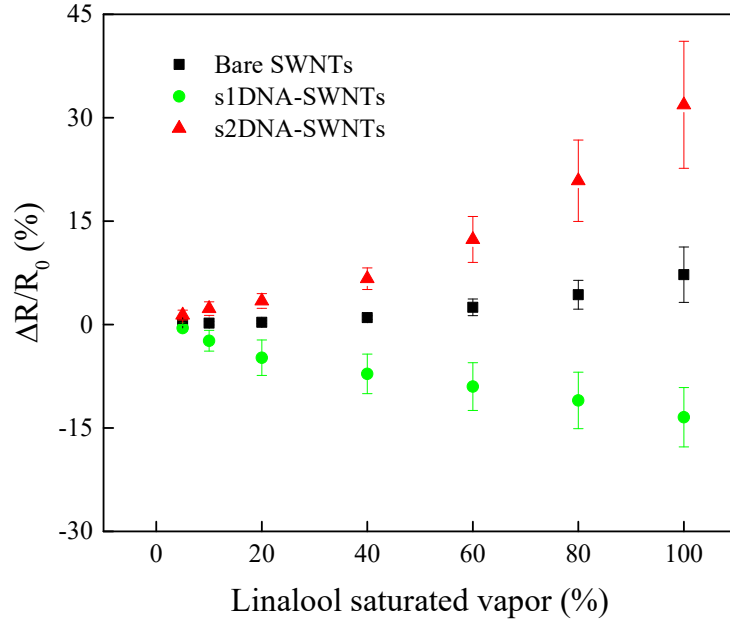


Figure 4. Calibration curves of bare and ssDNA coated SWNTs sensor towards different concentrations of linalool vapors performed at $V_{DS}=0.1$ V.

In this experiment, we use the gas device to generate the different VOCs. Due to the different vapor pressures of the different materials, the certain concentrations are totally different. It is much convenient for us using the percent concentration.

$$PV=nRT$$

P = Pressure (atmospheres), V = Volume (liters), n = Number of moles of gas, R = Molar gas constant, T = Temperature (Kelvin)

Table 1. The concentrations of four VOCs at 25 °C.

| | Analyte | Physical | CAS | Vapor Pressure | Concentration | LOD |
|---|--------------------|----------|-----------|----------------|---------------|-----------|
| 1 | Ethylhexanol | liquid | 104-76-7 | 0.36 mmHg | 432.72 | 7.005 ppm |
| 2 | Phenylacetaldehyde | liquid | 122-78-1 | 0.368 mmHg | 442.336 | 6.21 ppm |
| 3 | Linalool | liquid | 78-70-6 | 0.0905 mmHg | 108.781 | 1.24 ppm |
| 4 | (1-)tetradecene | liquid | 1120-36-1 | 0.01 mmHg | 12.02 | 0.104 ppm |

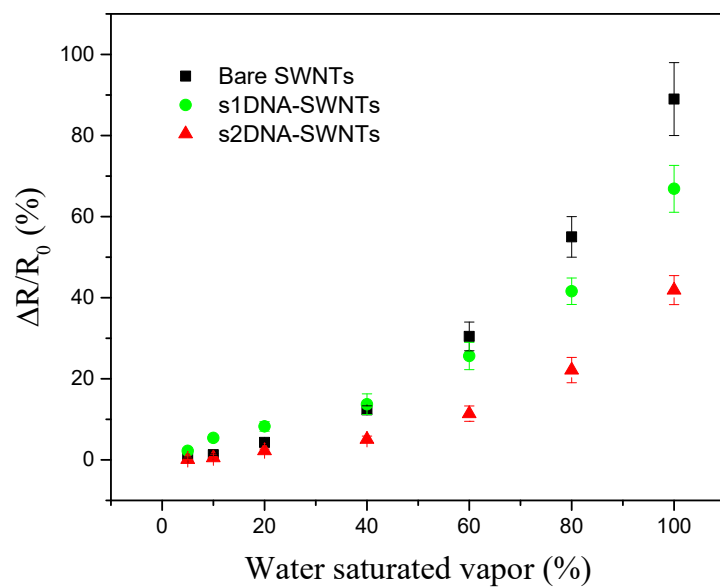


Figure S5. Calibration curves of bare and ssDNA coated SWNTs sensor towards different concentrations of water vapors performed at $V_{DS}=0.1$ V

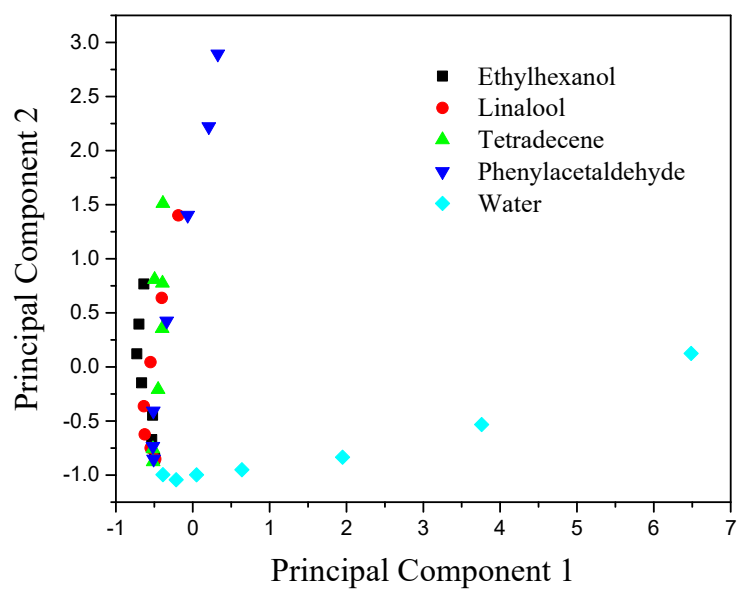


Figure 6. PCA plot (PC1 vs. PC2) of scores using three sensors (bare SWNTs, s1DNA-SWNT and s2DNA-SWNT) for four VOCs and water tests.

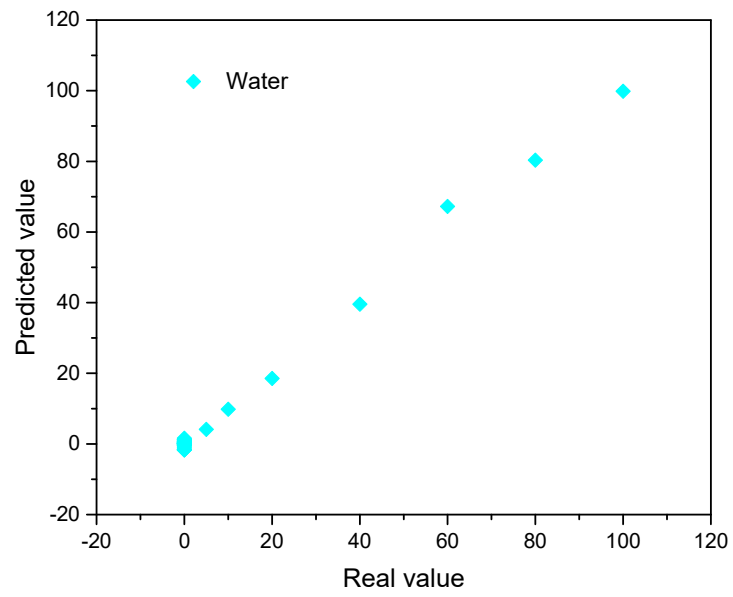


Figure 7. The real value versus the predicted value towards the different concentrations of water vapor calculated by the NNF.