Electronic Supplementary Information

Dog nose inspired high-performance NH_3 gas sensor of biomass carbon materials with pleated structure derived from rose tea

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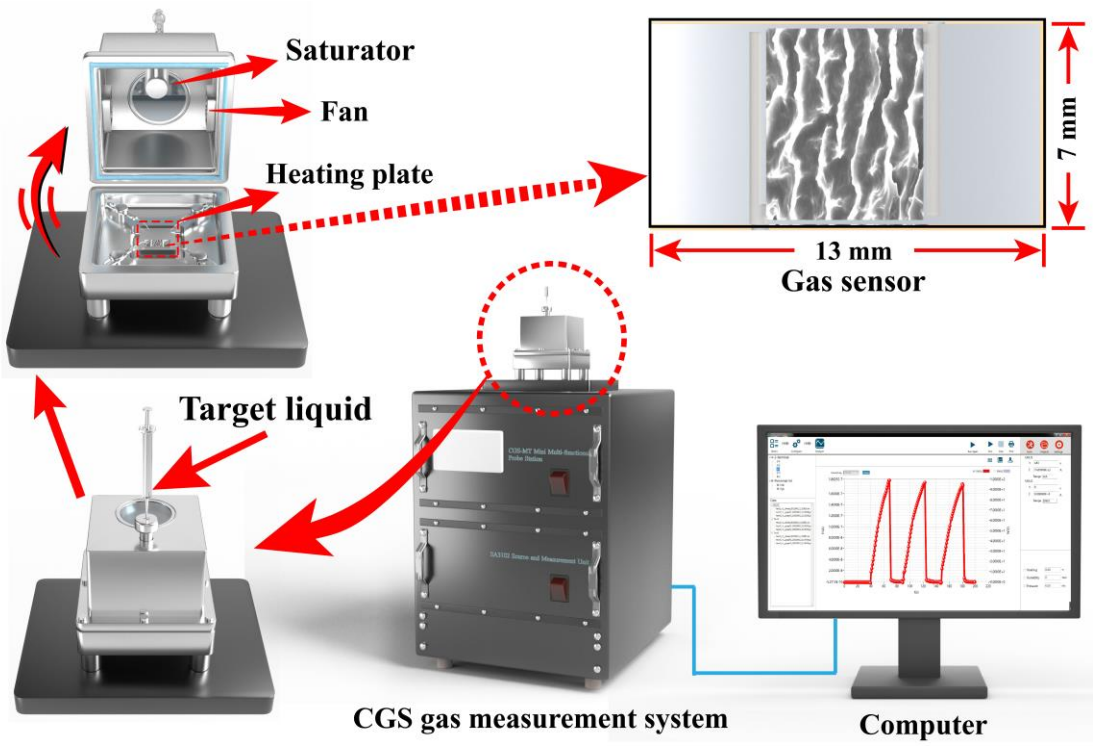

Fig. S1 Schematic diagram of the sensing test of the CRT sensor.

All target gases or vapours are generated by thermal evaporation by the following equation:[1]

$$Q=(V\times C\times M)/(22.4\times d\times \rho)\times 10^{-9}\times(273+T_R)/(273+T_C) \quad (1)$$

In the above equation, Q and V are the volume of the liquid to be taken and the volume of the test vessel, respectively. M is the molecular weight of the substance, d is the purity of the liquid, C is the concentration of the gas to be dispensed, ρ is the density of the liquid, T_R and T_C are the ambient temperature of the test and the temperature inside the test vessel. As shown in **Fig. S**1, the calculated target liquid is injected with a syringe into the liquid vaporizer (100°C), which is equipped with fans on both sides to rapidly produce the target vapor (or gas) in the chamber. The CGS gas sensing measurement system will record the change in the current signal of the sensing chip.

1 S. Cao, Z. Wu, Q. Sun, W. Zhang, S. Beysen, S. Wang, T. Shaymurat, M. Zhang and H. Duan, *Sensors and Actuators B: Chemical*, 2021, **337**, 129818. https://doi.org/10.1016/j.snb.2021.129818

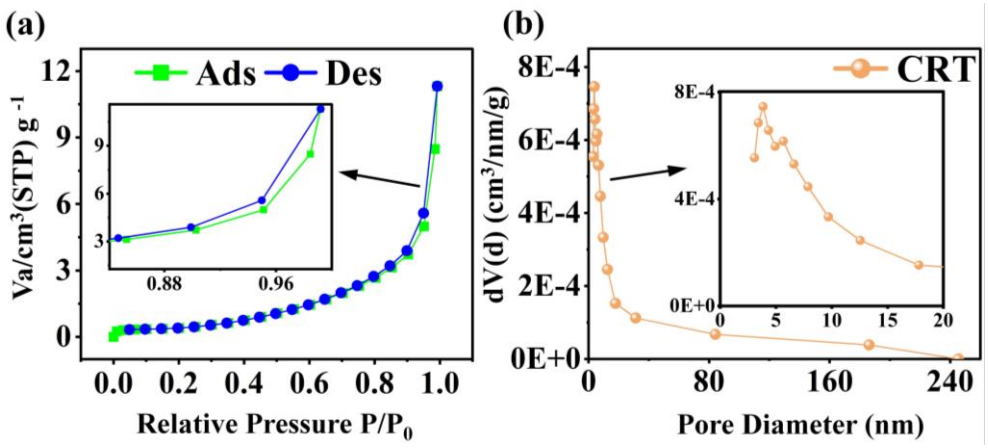

Fig. S2 (a) CRT nitrogen adsorption and desorption isotherms and (b) pore size distribution.

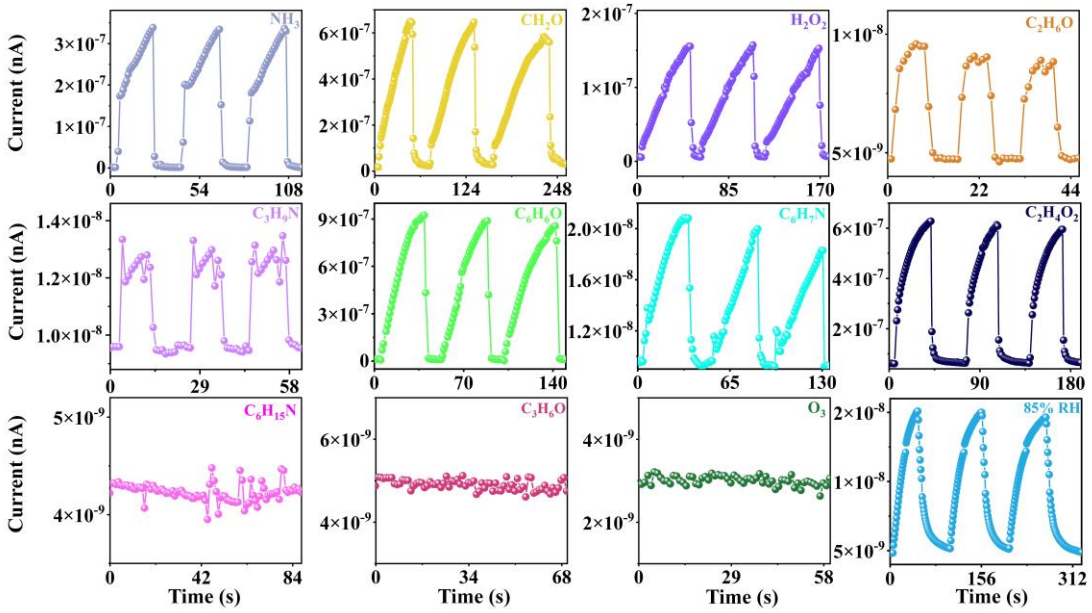

Fig. S3 Current curves of CRT towards 500 ppm NH_3, 1000 ppm of CH_2O, H_2O_2, C_2H_6O, C_3H_6O, C_3H_9N, $C_6H_{15}N$, C_6H_6O, C_6H_7N, 50 ppm O_3 and 85% RH at room temperature.

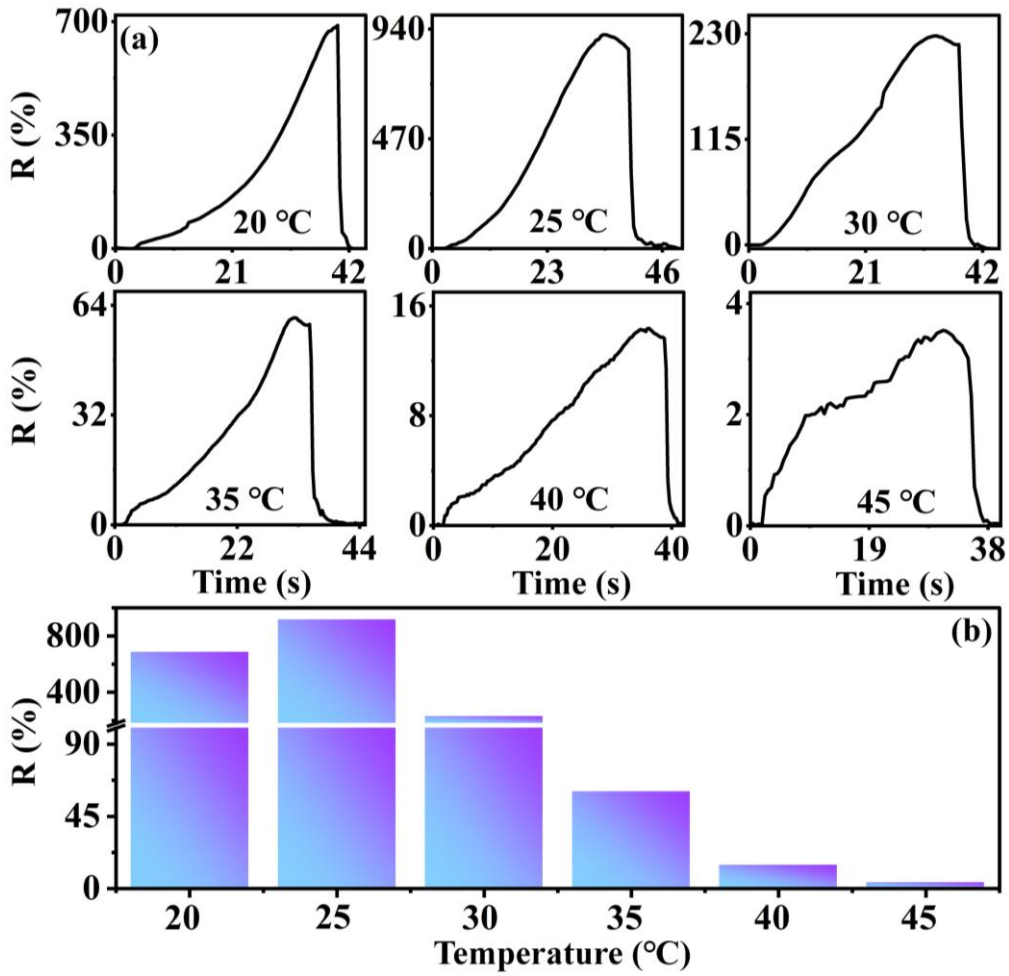

Fig. S4 (a) Response curves of the CRT sensor to 3 ppm NH_3 at different operating temperatures (20-45 °C) and corresponding (b) statistical diagrams of temperature and response.

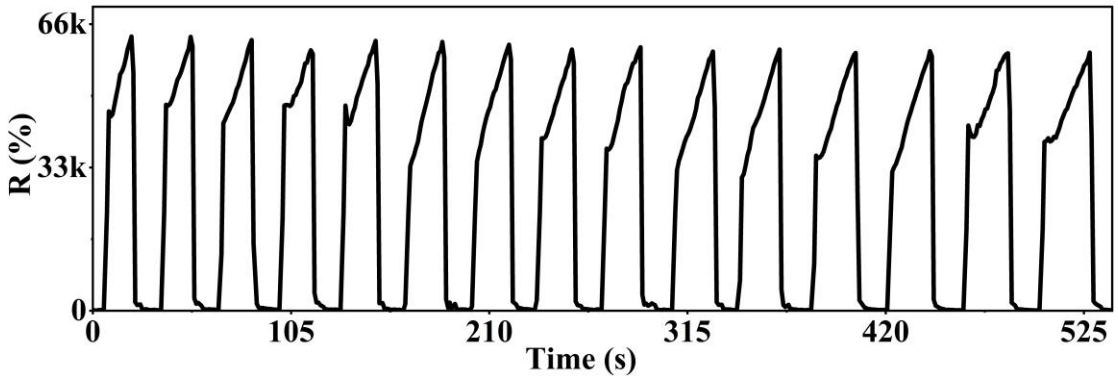

Fig. S5 Sensing curve of CRT sensor to 500 ppm NH_3 cycling for 15 cycles.

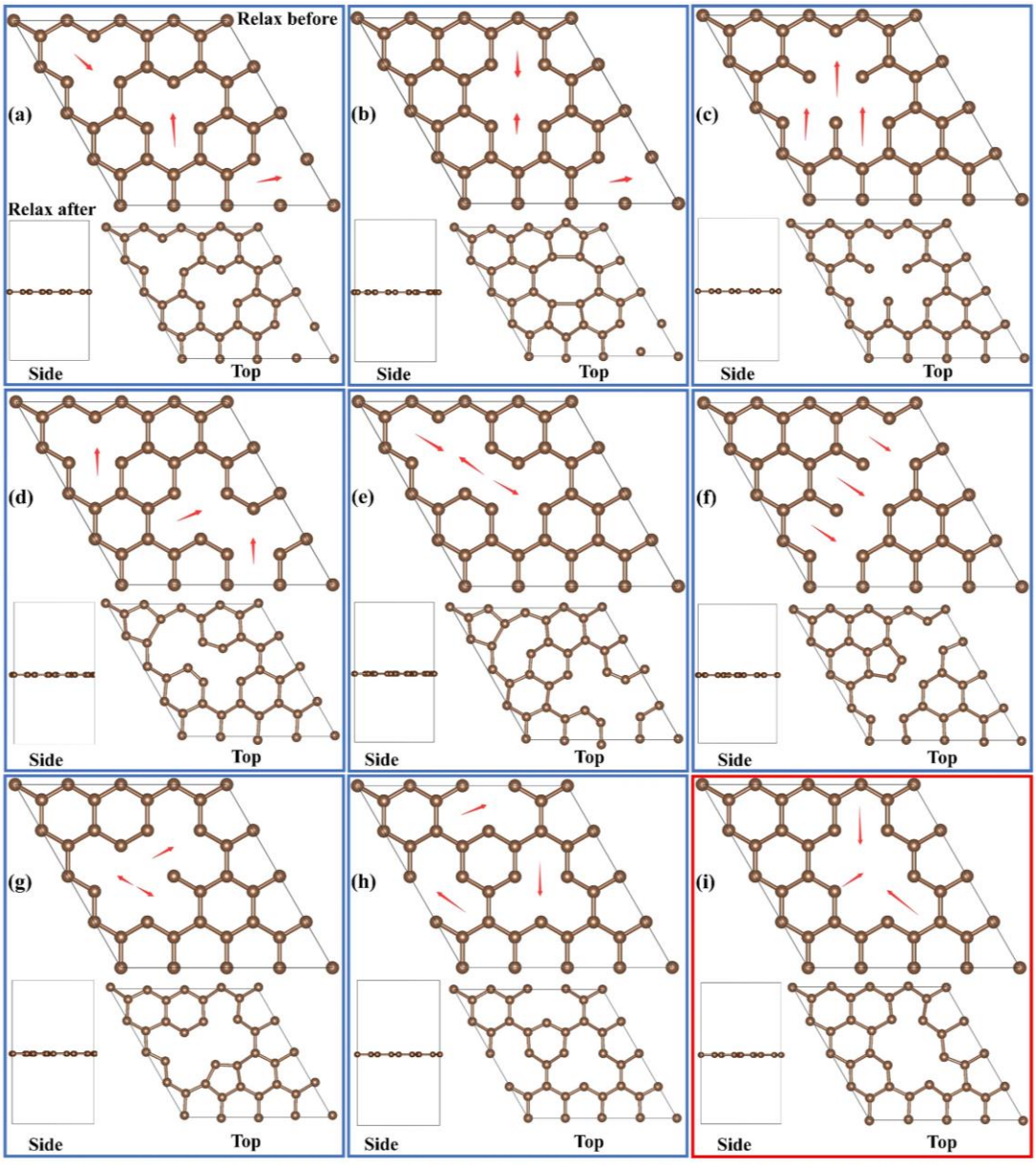

Fig. S6 (a-i) Nine defective configurations without K-doping.

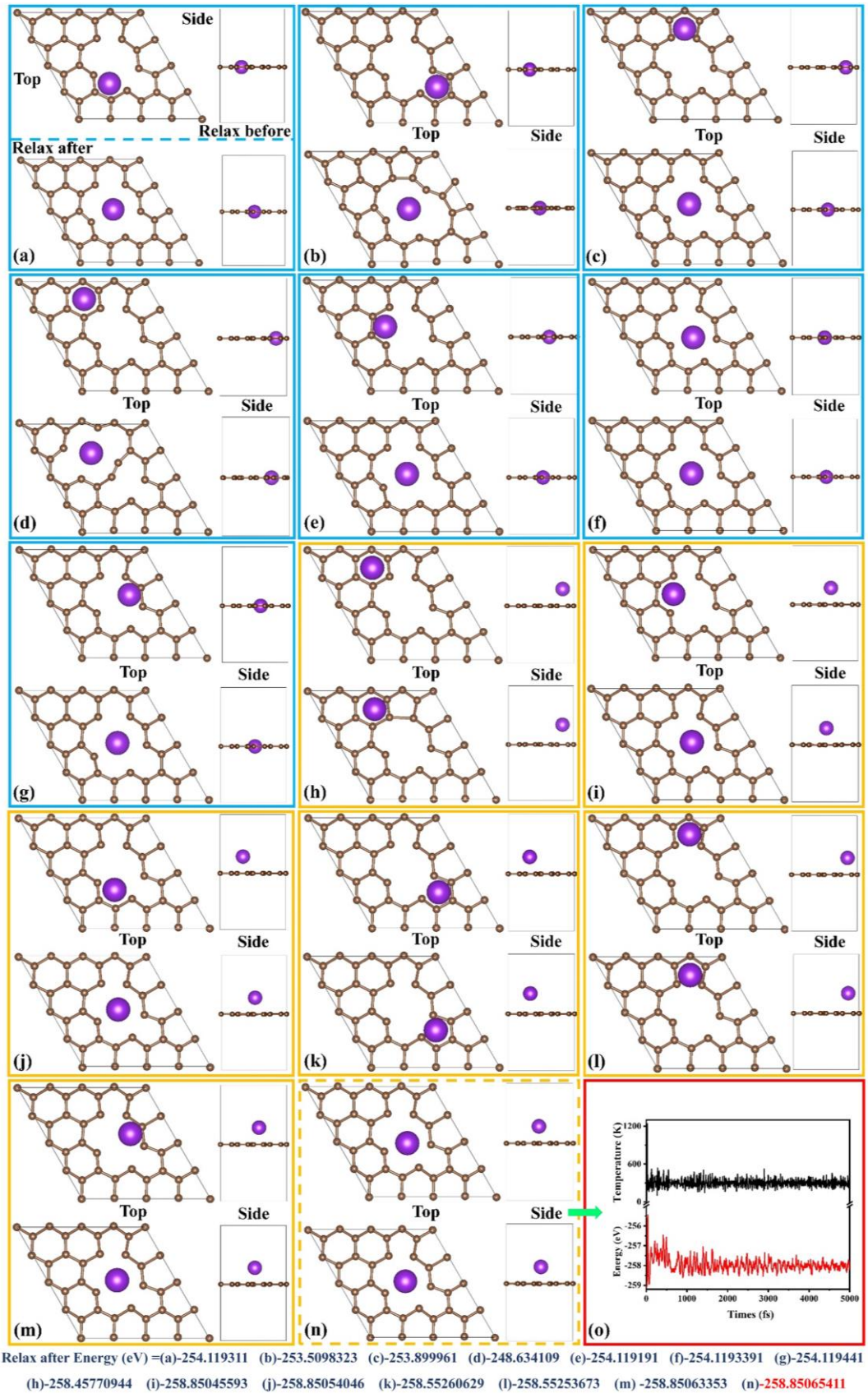

Fig. S7 (a-n) Possible structural configurations of CRTs and (o) Energy variation and temperature fluctuation of most stable configuration at the temperature of 300 K.