

Supplementary Information

Highly enhanced sensitivity of hydrogen sensors using novel
palladium-decorated graphene nanoribbon film/SiO₂/Si structures

*Zhongyang Zhang^{ab}, Qingzhong Xue^{*ab}, Yonggang Du^{*b}, Cuicui Ling^b, Wei Xing^b*

^aState Key Laboratory of Heavy Oil Processing, China University of Petroleum,
Qingdao 266580, Shandong, P. R. China

^bCollege of Science, China University of Petroleum, Qingdao 266580, Shandong, P. R.
China

E-mail: xueqingzhong@tsinghua.org.cn; duyg@upc.edu.cn

Tel: 86-532-86981169; Fax: 86-532-86981169

1. Selectivity of Pd-GNR/SiO₂/p-Si structure towards H₂ over various gases.

Fig. S1 demonstrates the good selectivity of the Pd-GNR/SiO₂/p-Si structure towards H₂ over various gasses at room temperature, including CO₂, NH₃, CH₄ and H₂O. The concentration of these gases is 10000 ppm, except H₂O (~97% RH). The sensitivities of the device to 10000 ppm of CO₂, NH₃, CH₄ and 97% of H₂O are 24.3%, 11.6%, 2.8% and 82.1% respectively, while the H₂ sensitivity of it is up to ~20000% at room temperature. This high selectivity results from the selective catalysis of Pd nanoparticles to hydrogen.

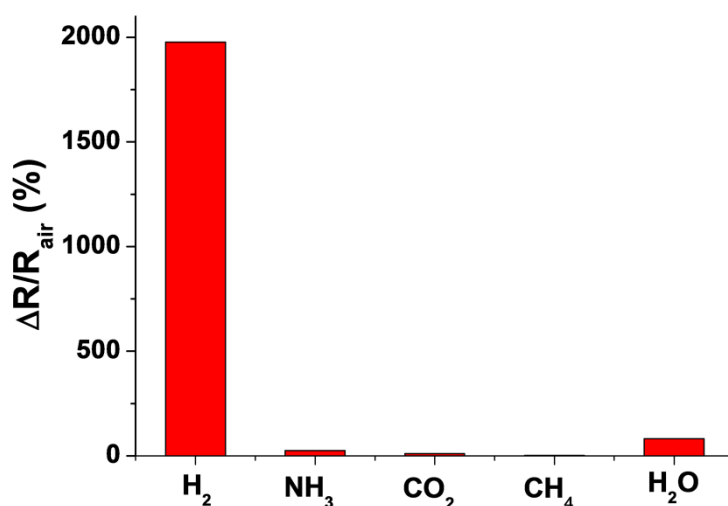


Fig. S1. Selectivity of Pd-GNR/SiO₂/p-Si structure measured with different tested gases in air (concentration of 10000 ppm) and H₂O (~97% RH) at room temperature.