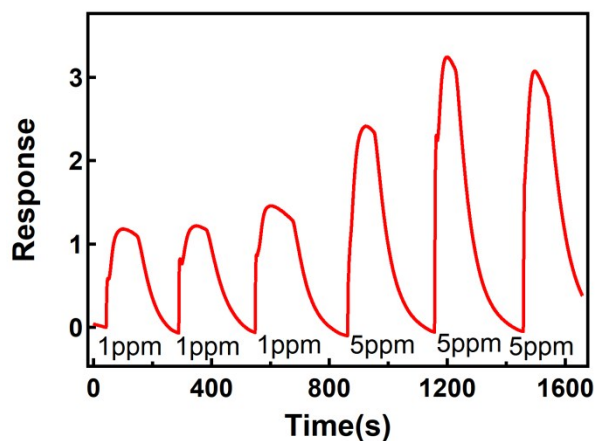
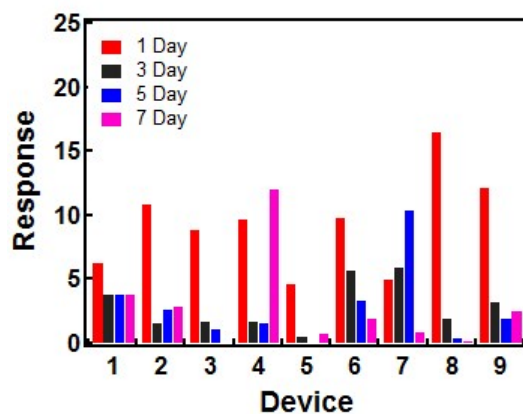


**Fig.1** The response of Pd-loaded SnO<sub>2</sub> nanospheres sensor to detect various H<sub>2</sub>S gas concentrations on 10 ppb to 200 ppm at optimal temperature of 150 °C. The insert is the response of Pd-loaded SnO<sub>2</sub> nanospheres sensor to detect H<sub>2</sub>S gas concentrations on 10 ppb to 40 ppb at optimal temperature of 150 °C.



**Fig.2** The response of Pd-loaded SnO<sub>2</sub> nanospheres sensor to detect 1 ppm and 5 ppm H<sub>2</sub>S gas concentrations on at working temperature of 200 °C.

To test the Pd-loaded SnO<sub>2</sub> gas sensors characteristic of repeatability, we repeat the experiments for 3-6 times at 1 ppm and 5 ppm in three circle and responses are similar in Fig.2



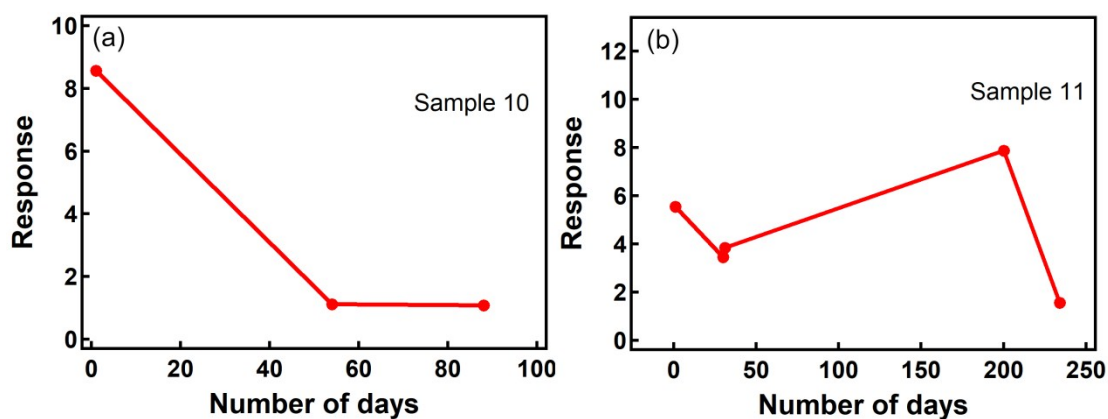
**Fig.3** Reproducibility and repeatability characteristic of Pd-loaded SnO<sub>2</sub> sensors to 1 ppm H<sub>2</sub>S. 9 devices

were tested at different days.

**Table 1.** Comparison in average and delta of response values of 9 Pd-loaded SnO<sub>2</sub> devices to 1 ppm H<sub>2</sub>S.

Characteristic	Device								
	1	2	3	4	5	6	7	8	9
Response average	3.03	2.57	1.03	5.14	0.48	3.73	4.96	0.88	2.84
Delta response	1.1	0.52	0.63	4.62	0.31	1.7	3.96	0.7	0.73

We have investigated more than 20 Pd-loaded SnO<sub>2</sub> sensors. The repeatability and reproducibility were test for 9 Pd-loaded SnO<sub>2</sub> sensors with exactly the preparation method. Devices were exposed to 1 ppm H<sub>2</sub>S at 200 °C at different days and the result is exhibited in Fig.3. Different colors represent repetitions at different day in the same experimental environment. The performance is similar between different devices. In large portion of devices, the performance drops after the first run and tend to be stable. Although there are cases responses are higher in the later tests. The repeatability was listed in table 1 for nine devices also.



**Fig. 4** Reproducibility characteristic of Pd-loaded SnO<sub>2</sub> sensors to 1 ppm H<sub>2</sub>S at different durations.

Long-term stability of the Pd-loaded SnO<sub>2</sub> sensors was investigated over 234 days for two devices (Fig.4). These data show without extensive exposing to corrosive gas, the samples kept their sensing ability. The variation is probably due to environmental changes, not due to sample changing.