Supplementary Information
Reduced Graphene Oxide and Graphene Composite Materials for Improved Gas Sensing at Low Temperature

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1) Setup for Gas Measurements

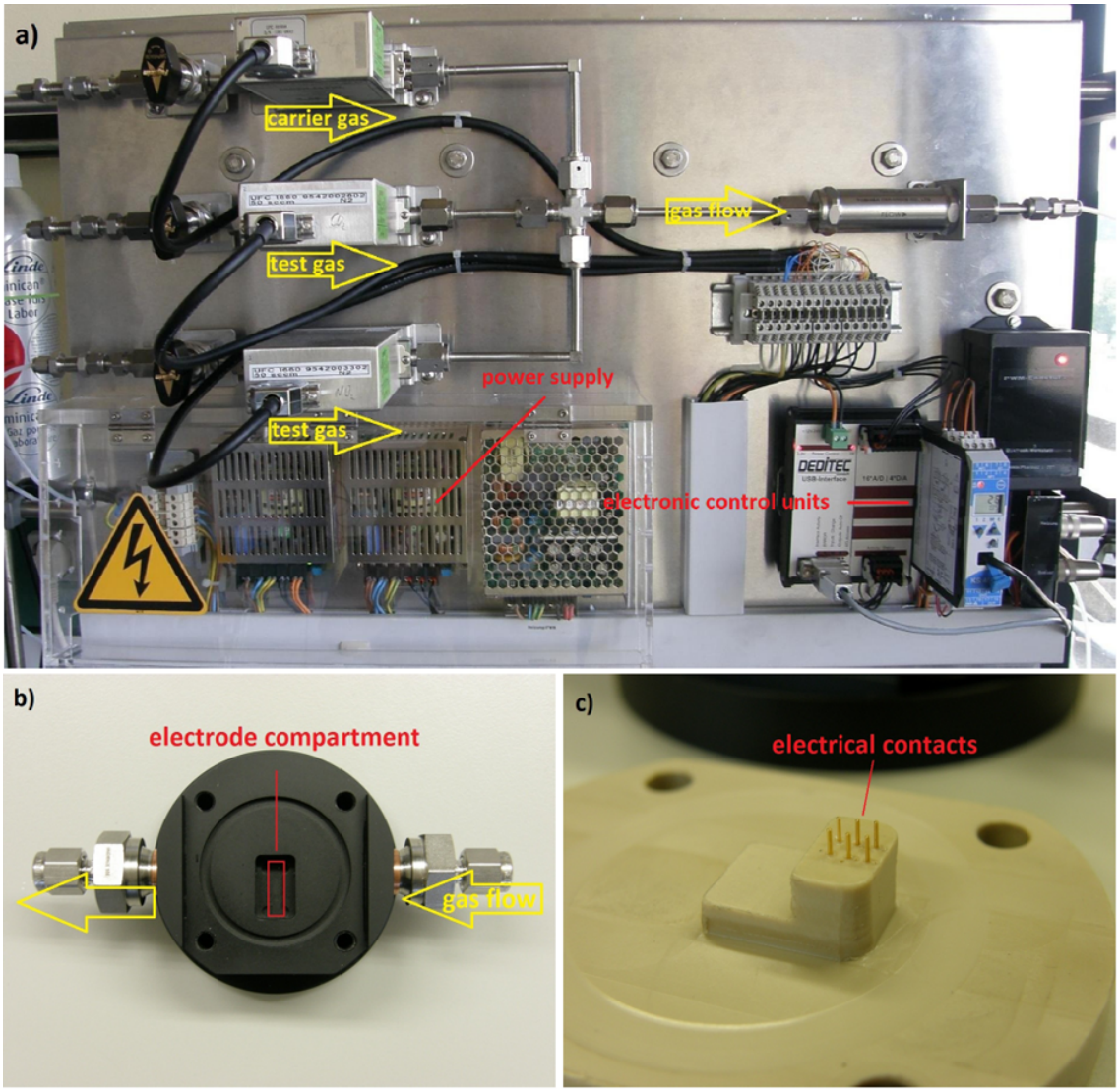

Fig. SI 1 (a) Gas mixing device and (b) flow cell with (c) corresponding lid.

2) Scanning Electron and Optical Microscopy Studies

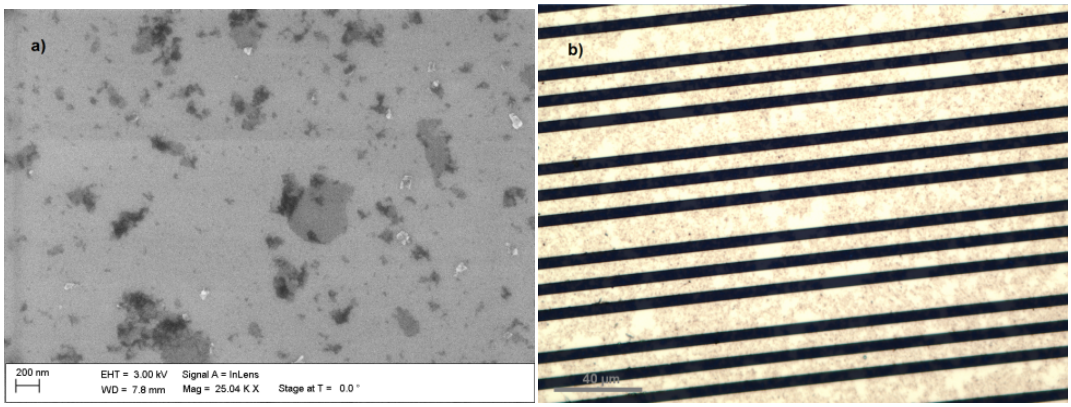

Fig. SI 2 (a) SEM of rGO on a Si/SiO_2 substrate and (b) microscope picture of rGO modified interdigital electrode structure.

3) Thermogravimetric Analysis coupled by Infrared Detector

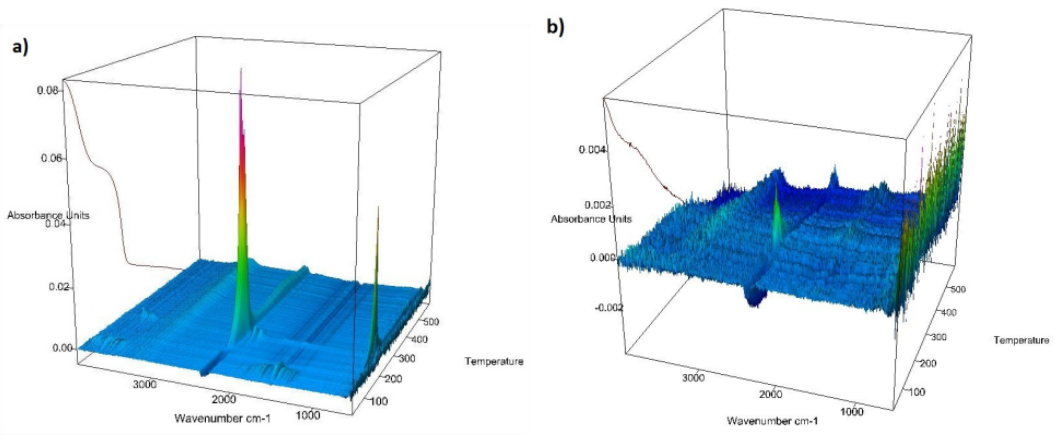

Fig. SI 3 3D-plot of GO (a) and rGO (b) analyzed with FTIR-TGA.

4) Raman Studies of Graphene Composite Materials

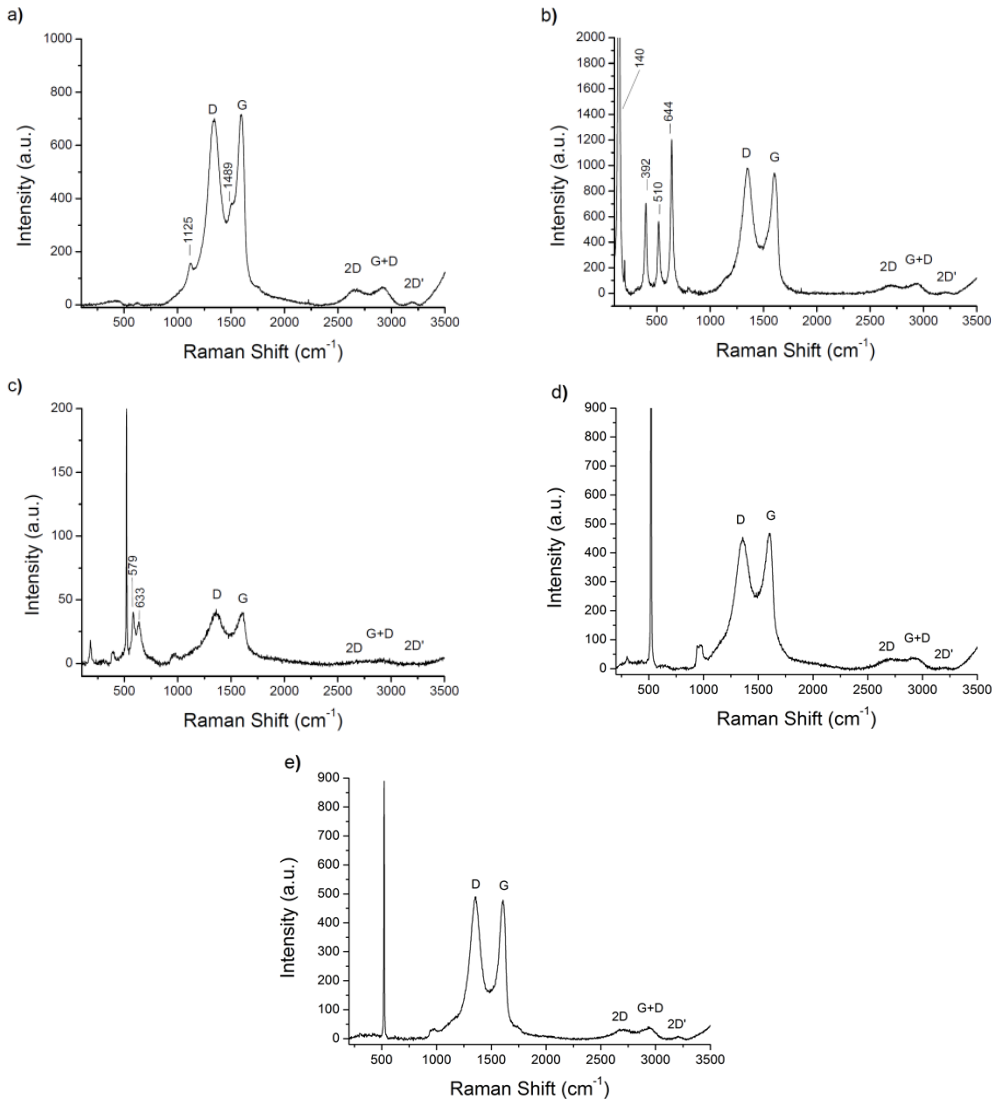

Fig. SI 4 Raman of rGO modified with (a) ODA, (b) TiO_2, (c) MnO_2, (d) Pd and (e) Pt-nanoparticles. Peaks at 520 cm^{-1} and 970 cm^{-1} can be attributed to the Si/SiO_2 substrate.

5) Scanning Electron Microscopy Studies of the Composite Materials

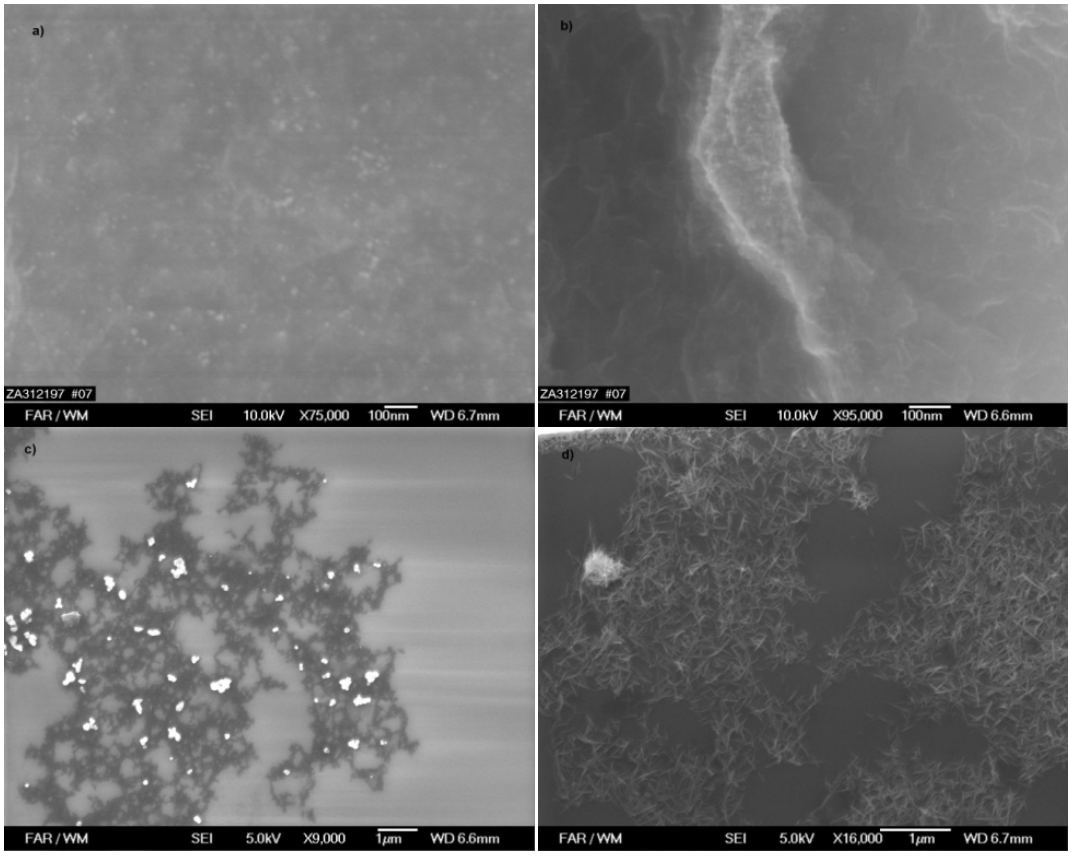

Fig. SI 5 SEM of rGO modified with (a) Pd- and(b) Pt-nanoparticles, (c) TiO_2, and (d) MnO_2.

6) Transmisson Electron Microscopy Studies

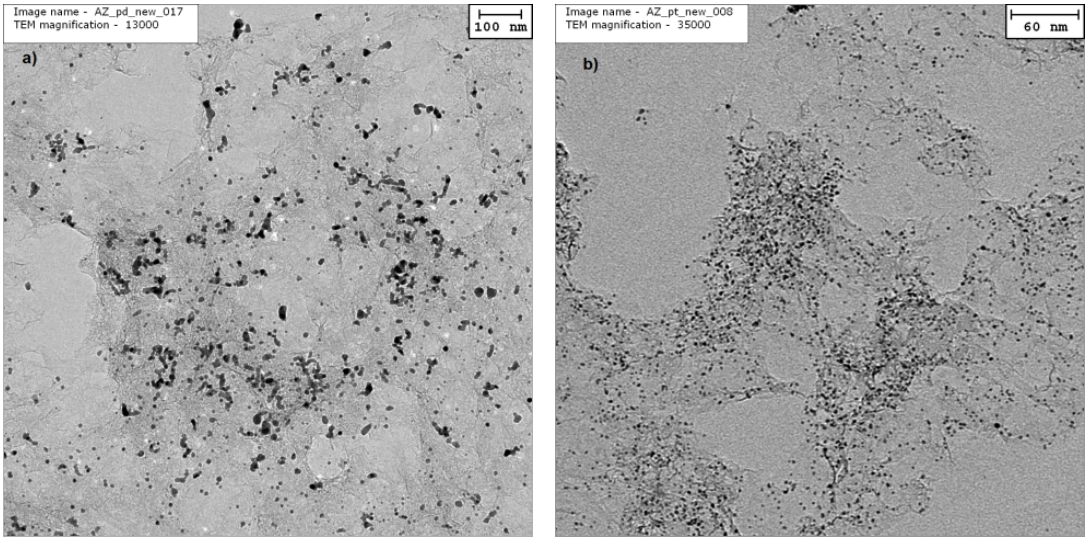

Fig. SI 6 TEM of rGO modified with (a) Pd- and (b) Pt-nanoparticles.

7) Energy Dispersive X-Ray Spectroscopy Studies

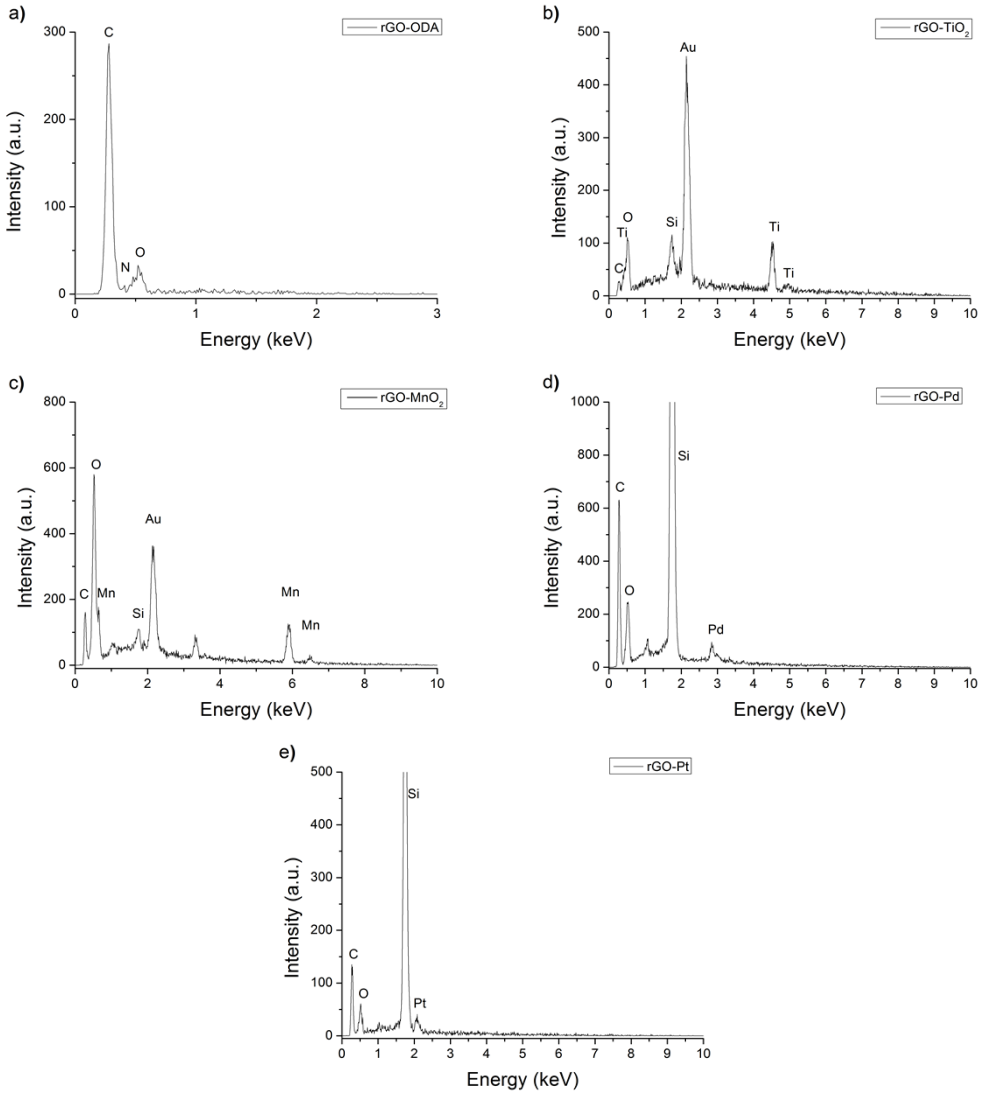

Fig. SI 7 EDS spectra of rGO modified with (a) ODA, (b) TiO_2, (c) MnO_2, (d) Pd, and (e) Pt. Peaks of Au, Si and partially O can be attributed to the microelectrode substrates.

8) Influence of Temperature, Humidity and Bias Voltage on Sensor Properties

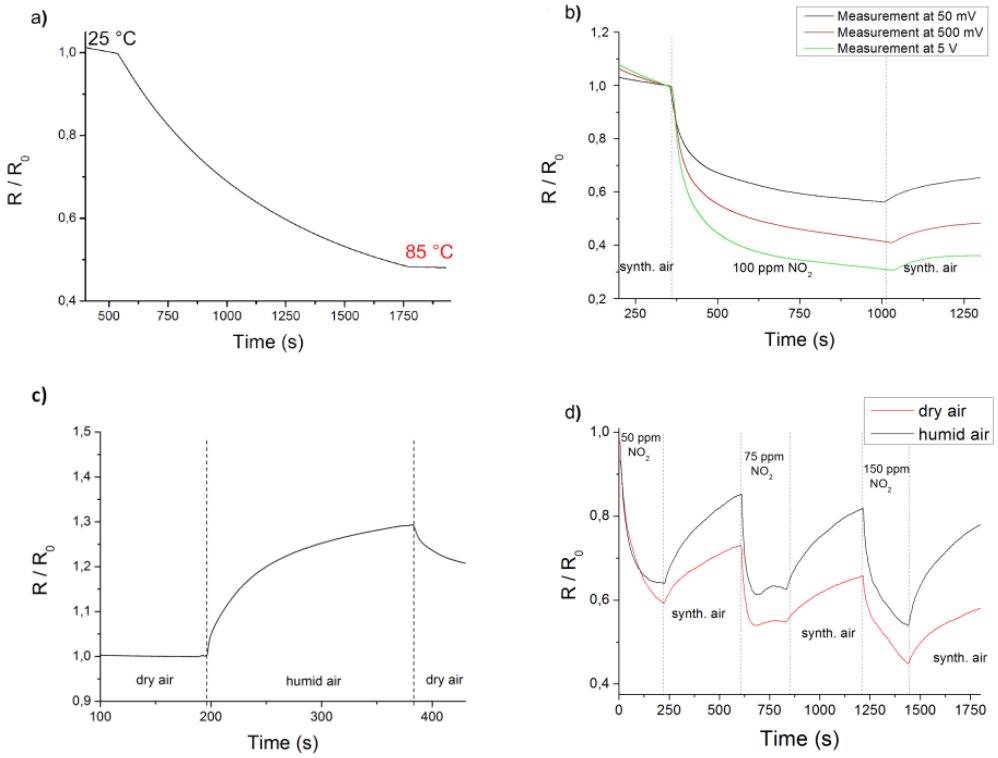

Fig. SI 8 Influence of continuous heating from 25 °C to 85 °C (a) and air humidity on conductance (c), applied current (b) and regeneration (d) of the on the response towards NO_2 at 85 °C of rGO modified electrodes.

9) Chemiresistive Gas Detection with Different Graphene Composites

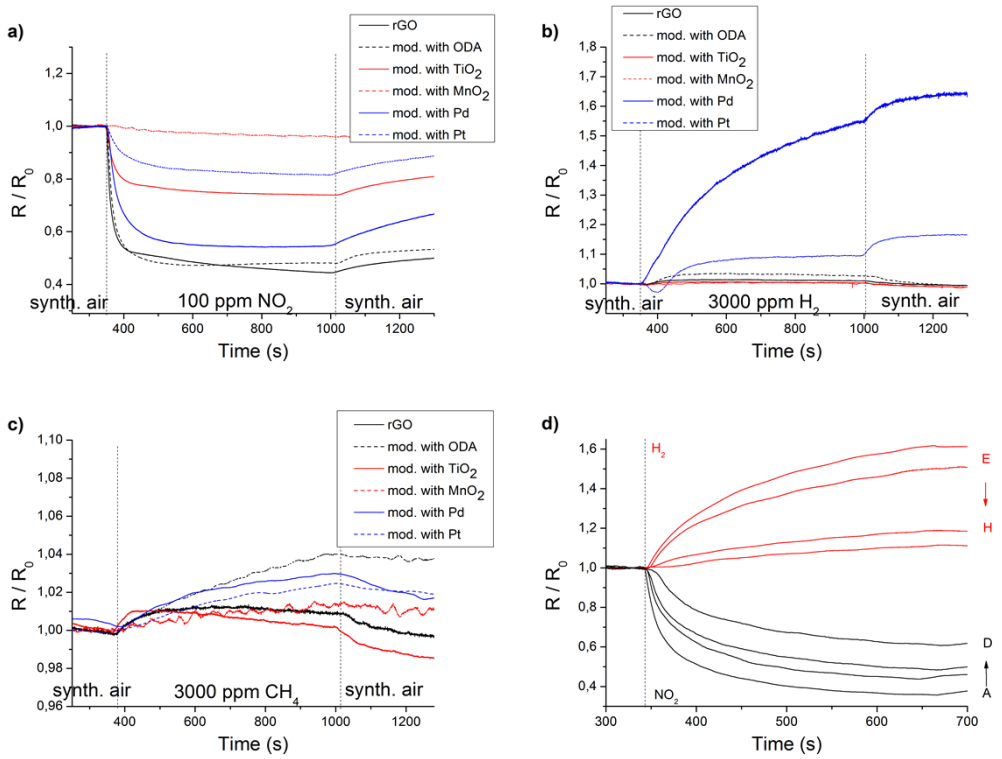

Fig. SI 9 Response of rGO and modifications in the presence of (a) 100 ppm NO_2, (b) 3000 ppm H_2, (c) 3000 ppm CH_4 at 85 °C, and (d) change in electrical resistance of rGO-Pd for H_2 (red) and NO_2 (black). The concentration ranges from 25 (A), 50 (B), 100 (C) and 150 (D) ppm for NO_2 and from 500 (E), 1000 (F), 3000 (G) and 5000 (H) ppm for H_2