Electronic Supplementary Information (ESI) for

Urchin-Like Polypyrrole Nanoparticles for Highly Sensitive and Selective Chemiresistive Sensor Application

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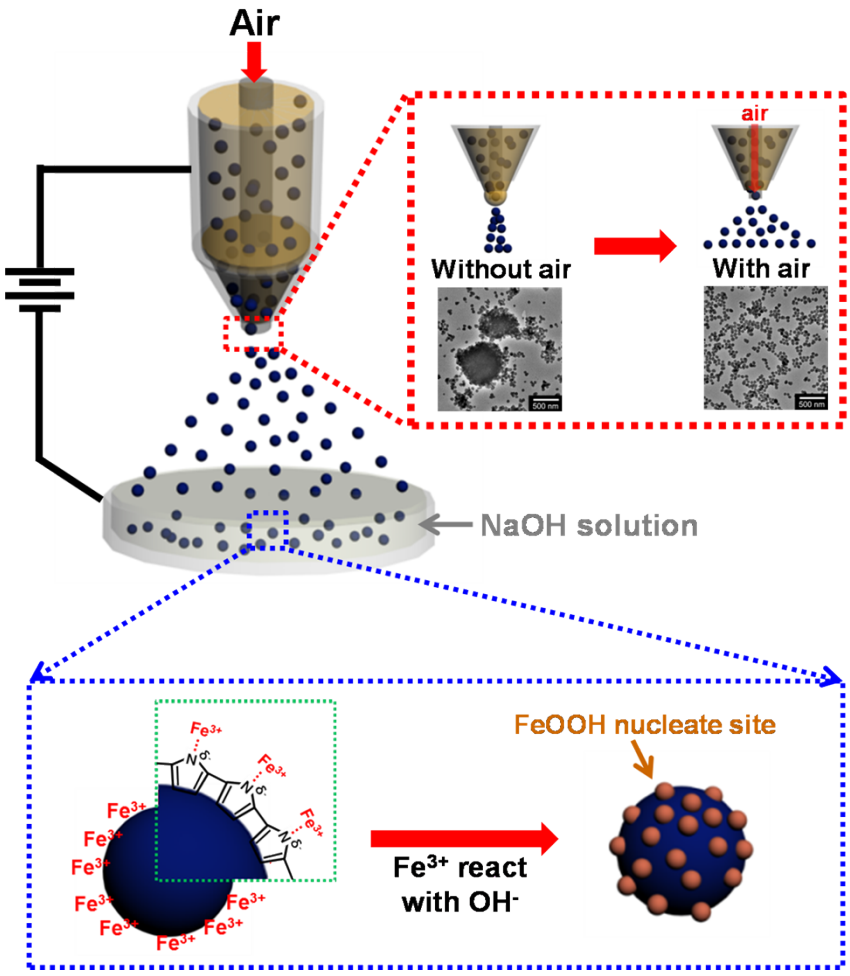

Fig. S1. Schematic illustration of the formation of FeOOH nucleate site by using dual-nozzle electrospray method with air blowing (red inset: comparison of electrosprayed particles by control compressed air blowing).

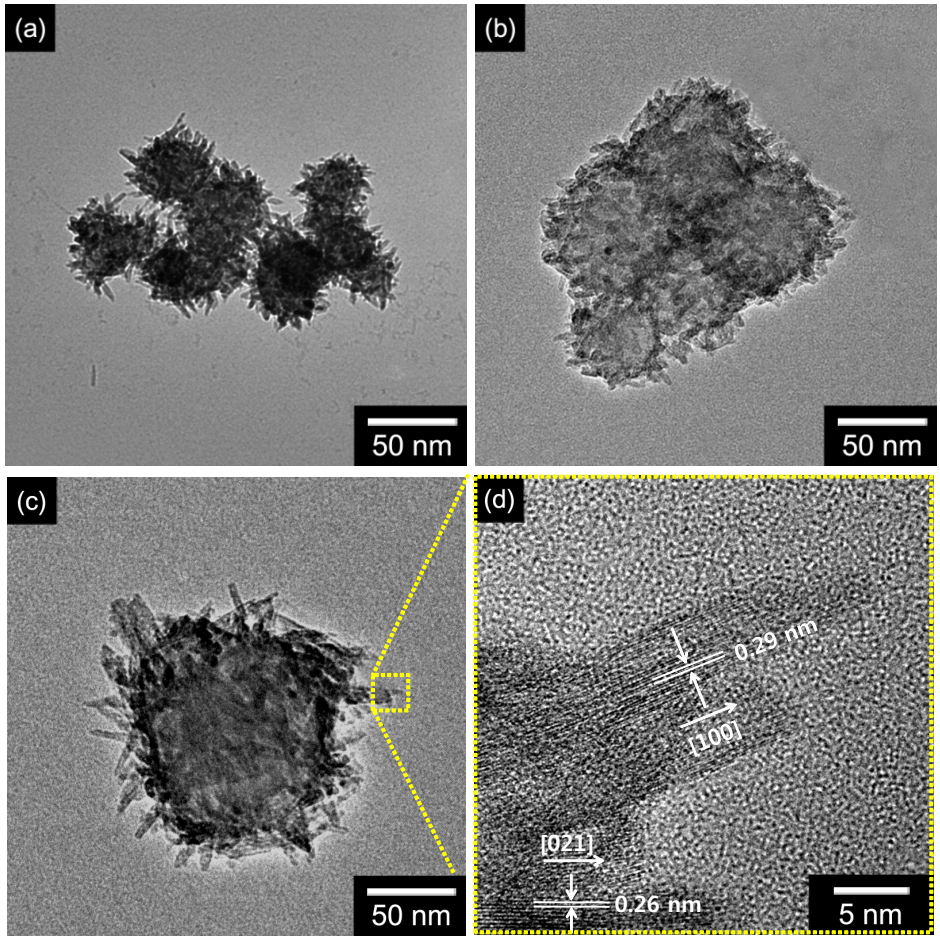

Fig. S2. TEM images of FeOOH nanoneedle decorated PPy NPs with different diameters of (a) 30 nm, (b) 60 nm, and (c) 100 nm. (d) HR-TEM image of FeOOH nanoneedles on the surface.

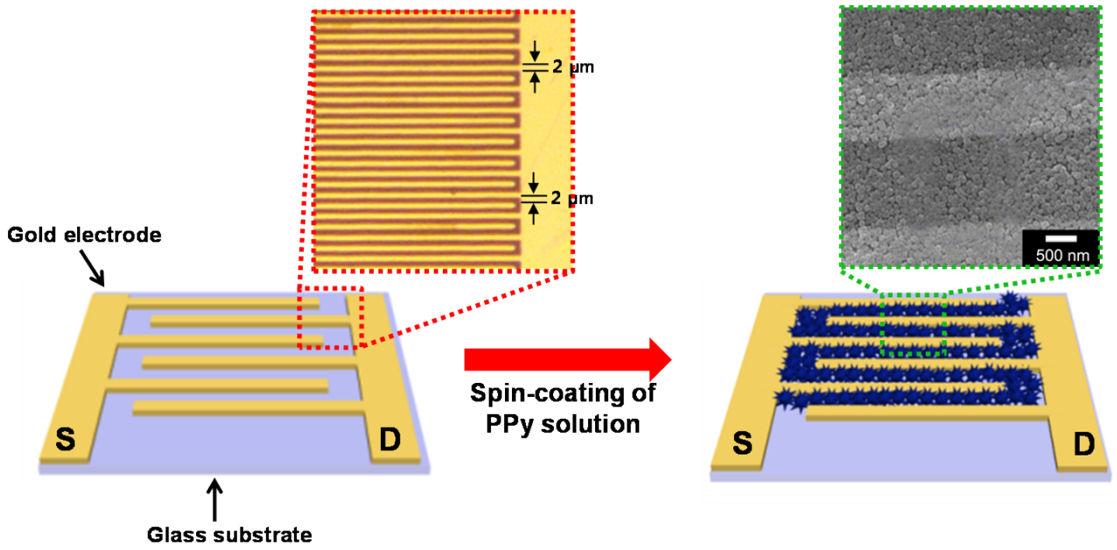

Fig. S3. Schematic illustration of inter-digitated array electrode and U_PPy nanoparticle deposited electrode by spin-coating method (red inset: optical micrograph image of electrode; green inset: SEM image of U_PPy deposited electrode).

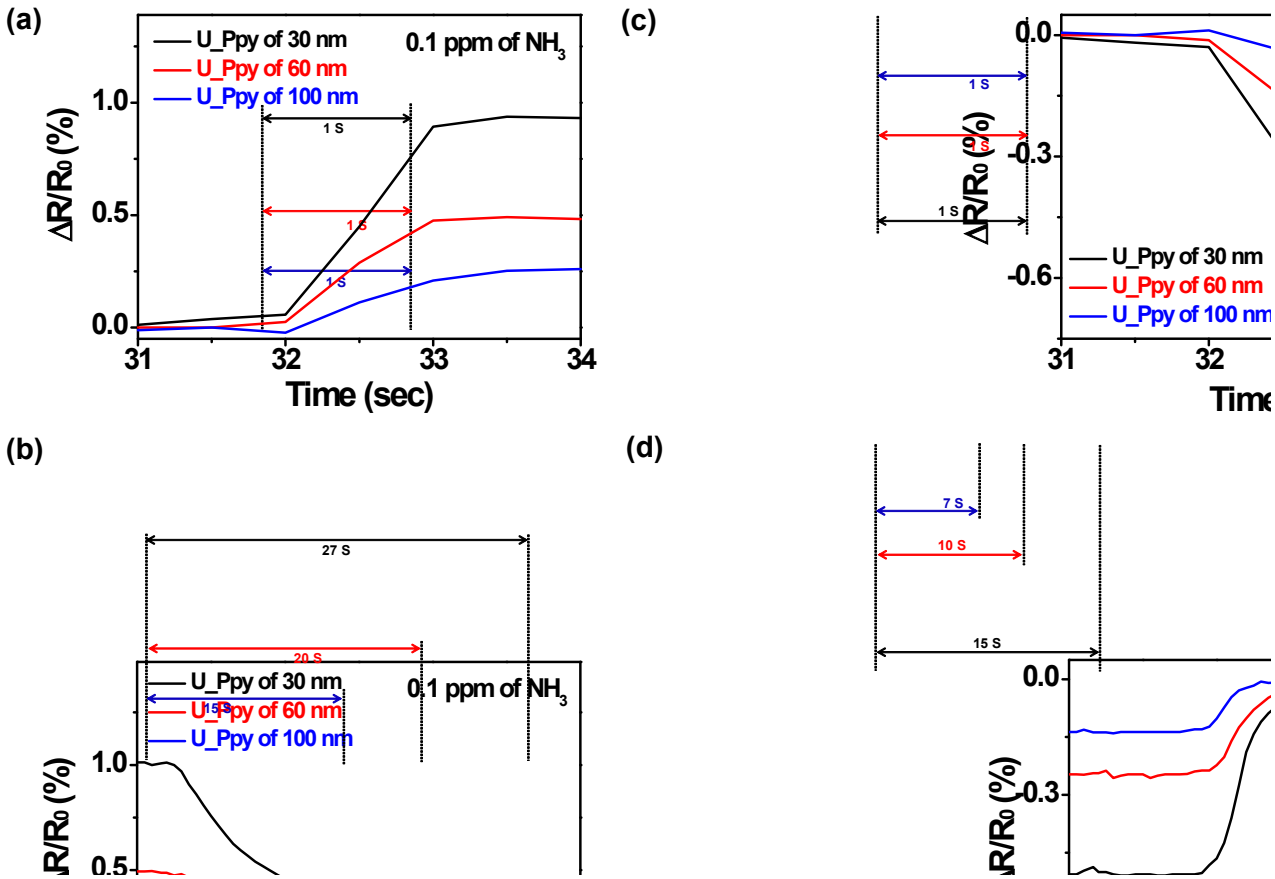

Fig. S4. The response and recovery times of urchin-like PPy particles with different diameters toward (a), (b) 0.1 ppm of NH_3 and (c), (d) 5 ppm of MeOH gas (black: 30 nm; red: 60 nm; blue: 100 nm diameter).

Table S1. Minimum detectable level of 30-nm-diameter pristine PPy and U_PPy nanoparticles to various gases

	pristine PPy	U_PPy
Acetaldehyde	100 ppm	10 ppm
Acetone	10 ppm	2 ppm
Ammonia	5 ppm	0.01 ppm
Butane	10 ppm	1 ppm
Benzene	10 ppm	1 ppm
Chloroform	30 ppm	2 ppm
Dimethylamine	30 ppm	1 ppm
Ethanol	40 ppm	0.2 ppm
Hexane	150 ppm	30 ppm
Methanol	50 ppm	0.5 ppm
Naphtalene	10 ppm	1 ppm
Trimethylamine	100 ppm	5 ppm
Toluene	10 ppm	1 ppm