

Electronic Supplementary Information (ESI)

Assembly of polythiophenes on responsive polymer microgels for highly selective detection of ammonia gas

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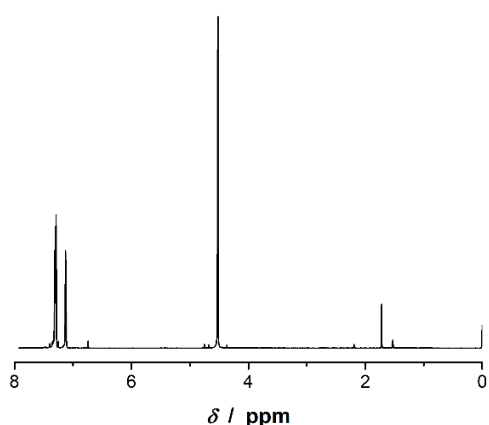


Fig. S1. ¹H NMR spectrum of compound 1 in CDCl₃.

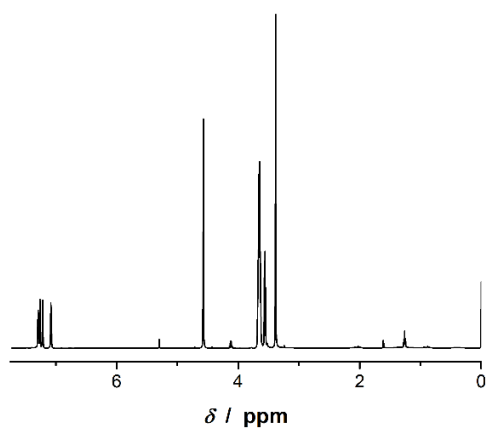


Fig. S2. ^1H NMR spectrum of compound 2 in CDCl_3 .

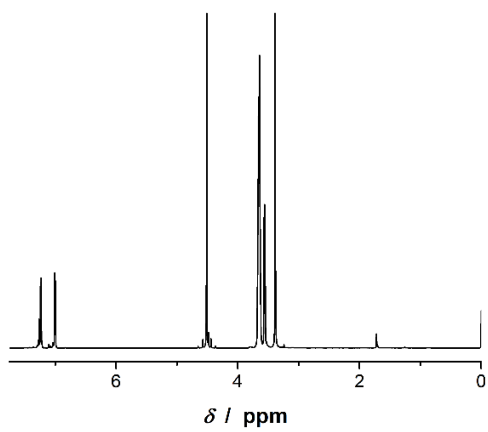


Fig. S3. ^1H NMR spectrum of compound 3 in CDCl_3 .

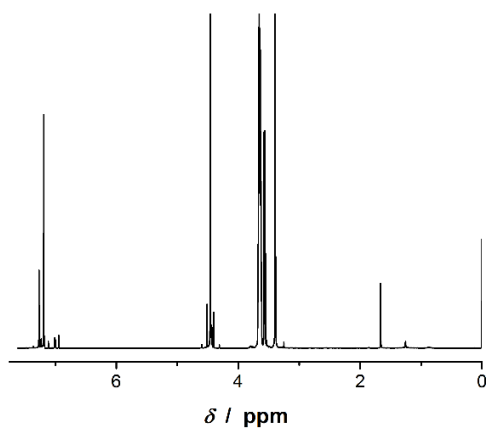


Fig. S4. ^1H NMR spectrum of compound 4 in CDCl_3 .

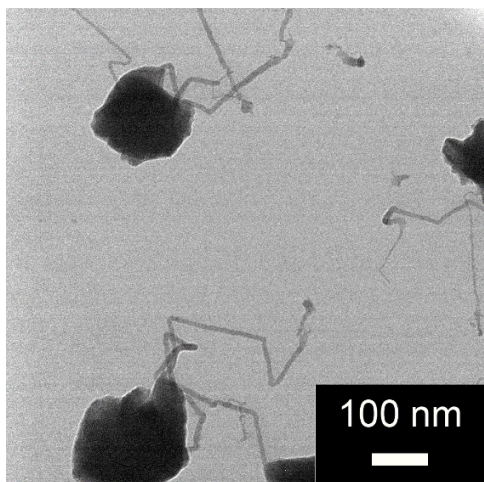


Fig. S5. An amplified TEM image of AP-10.

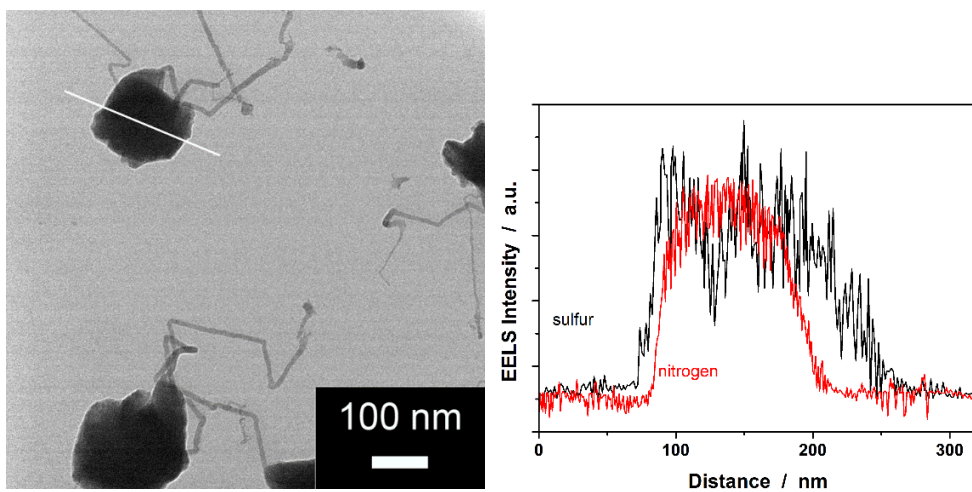


Fig. S6. EELS recorded on an individual particle of AP-10.

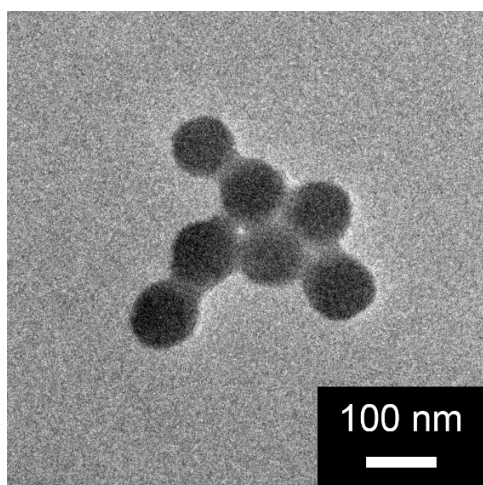


Fig. S7. Typical TEM image of ARM microgel templates.

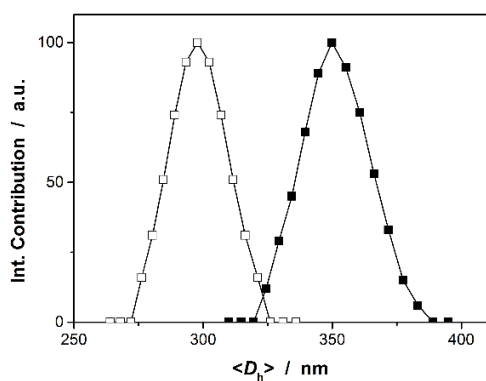


Fig. S8 DLS size distribution of the AP-0.1 (■) and ARM microgels (□). All measurements were made at 25.0 °C.

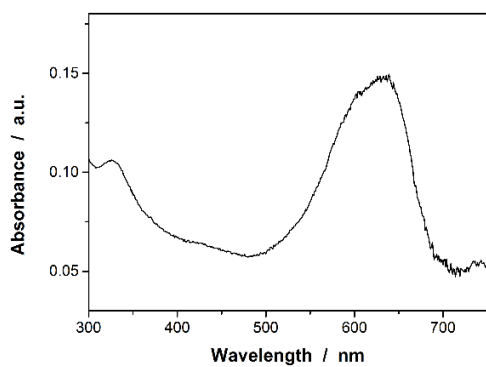


Fig. S9. UV-vis spectrum of ARM microgels.

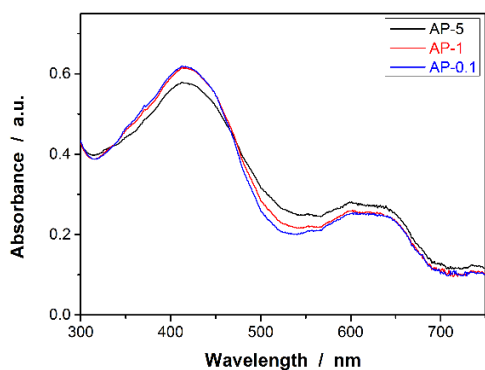


Fig. S10. Typical UV-vis absorption spectra of the films made of the composite materials AP-5, AP-1 AND AP-0.1.

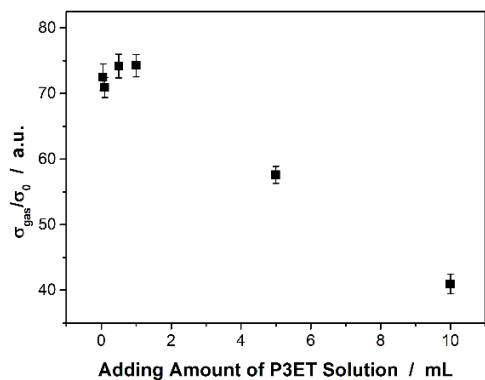


Fig. S11 A comparison of the electrical response upon exposing to the ammonia gases (50.0 ppm), showing the effect of the adding amount of P3ET solution for preparing the composite materials.

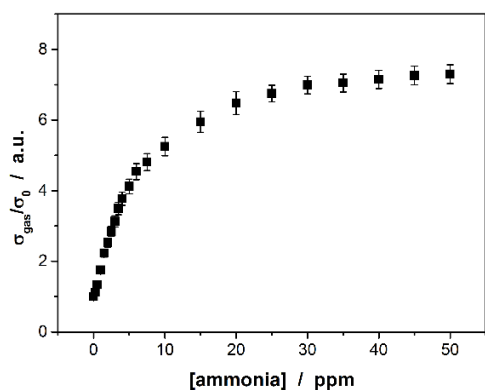


Fig. S12 Electrical response of the P3ET films upon exposure to the ammonia gas.

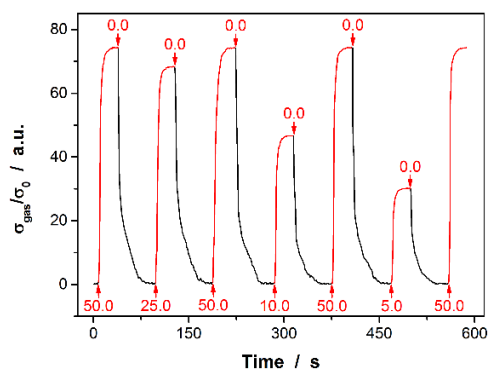


Fig. S13 Electrical response cycles, upon the repeated exposing to the ammonia gas ([ammonia] = 50.0 ppm, 25.0 ppm, 10.0 ppm, or 5.0 ppm) and the N₂ gas (i.e., [ammonia] = 0.0 ppm), of the films made of AP-1.

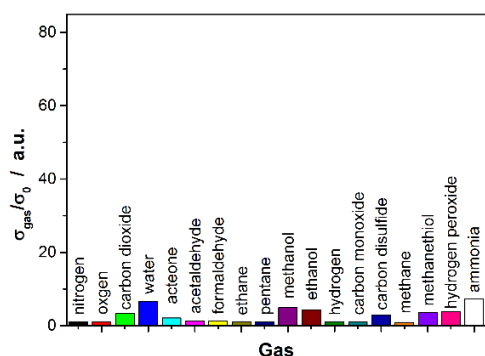


Fig. S14 A comparison of the electrical response of the P3ET films upon exposing to the ammonia and non-ammonia gases (50.0 ppm).

Table S1. Interference Tests on Ammonia Concentration Reading by using the Films

constituents	concentration	relative error ^a
acetone	100 ppm	+0.06%
methanol	100 ppm	+3.33%
ethanol	100 ppm	+3.14%
ethane	100 ppm	+0.02%
pentane	100 ppm	+0.01%
acetaldehyde	100 ppm	+0.01%
formaldehyde	100 ppm	+0.01%
CH ₃ SH	100 ppm	-3.57%
H ₂	100 ppm	+0.01%
O ₂	100 ppm	+0.01%
CO	100 ppm	+0.03%
CO ₂ ^b	500 ppm	+1.12%
	5%	+3.13%
CS ₂	100 ppm	-4.52%
CH ₄	100 ppm	+0.01%
H ₂ O ₂	100 ppm	+2.31%
	100 ppm	+4.16%
H ₂ O	250 ppm	+5.27%
	500 ppm	-0.17%

^a “+” and “-” indicate an increase and decrease, respectively, in apparent ammonia concentration related to the actual ammonia concentration.

^b The atmosphere contains ca. 400ppm CO₂, and the air we exhale roughly contains 4-5% CO₂.