Supplementary Material (ESI) for *Journal of Materials Chemistry*

-Supporting Information-

Highly Controlled Core/Shell Structures: Tunable Conductive Polymer Shells on Gold Nanoparticles and Nanochains

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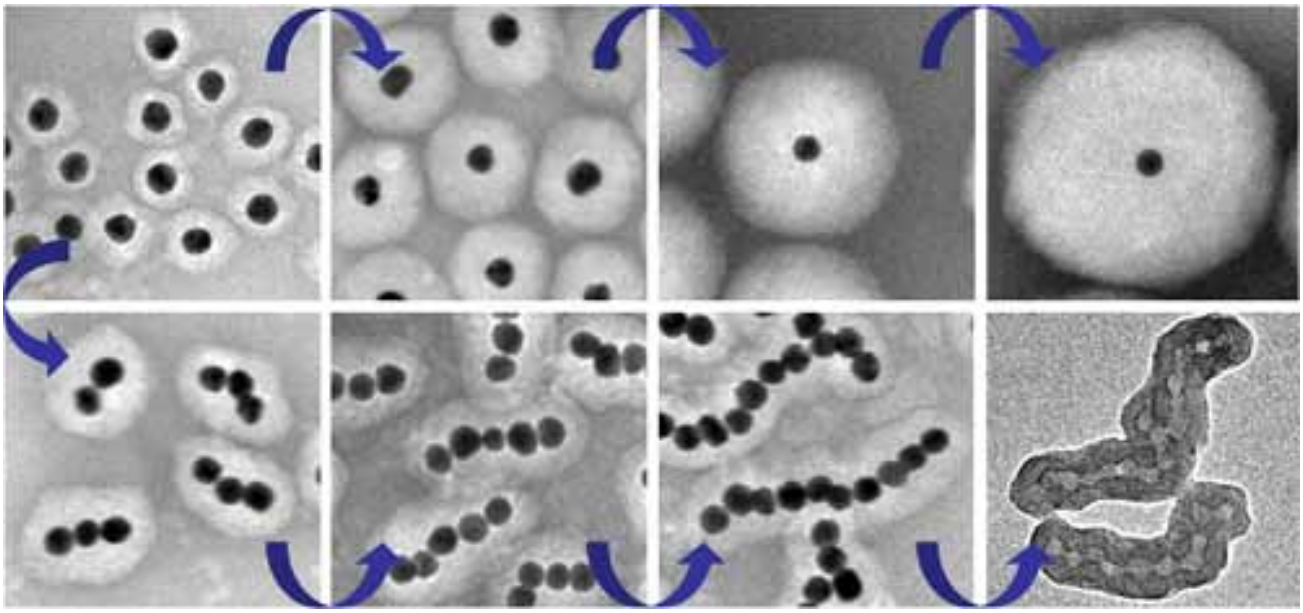

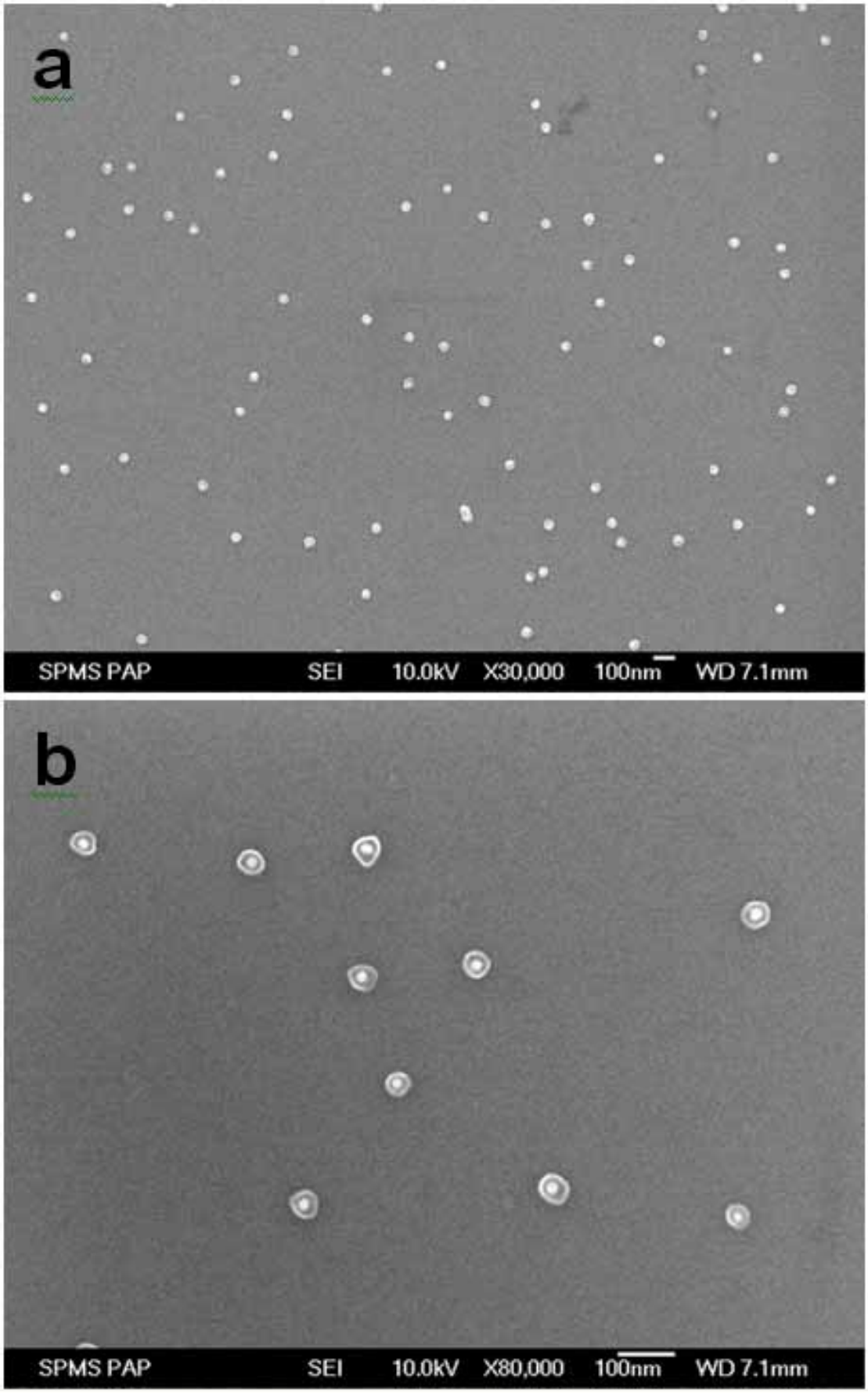

Figure S1. SEM images of AuNP@PANI immobilized on NH_2-coated silicon wafer at low (a) and high magnifications (b).

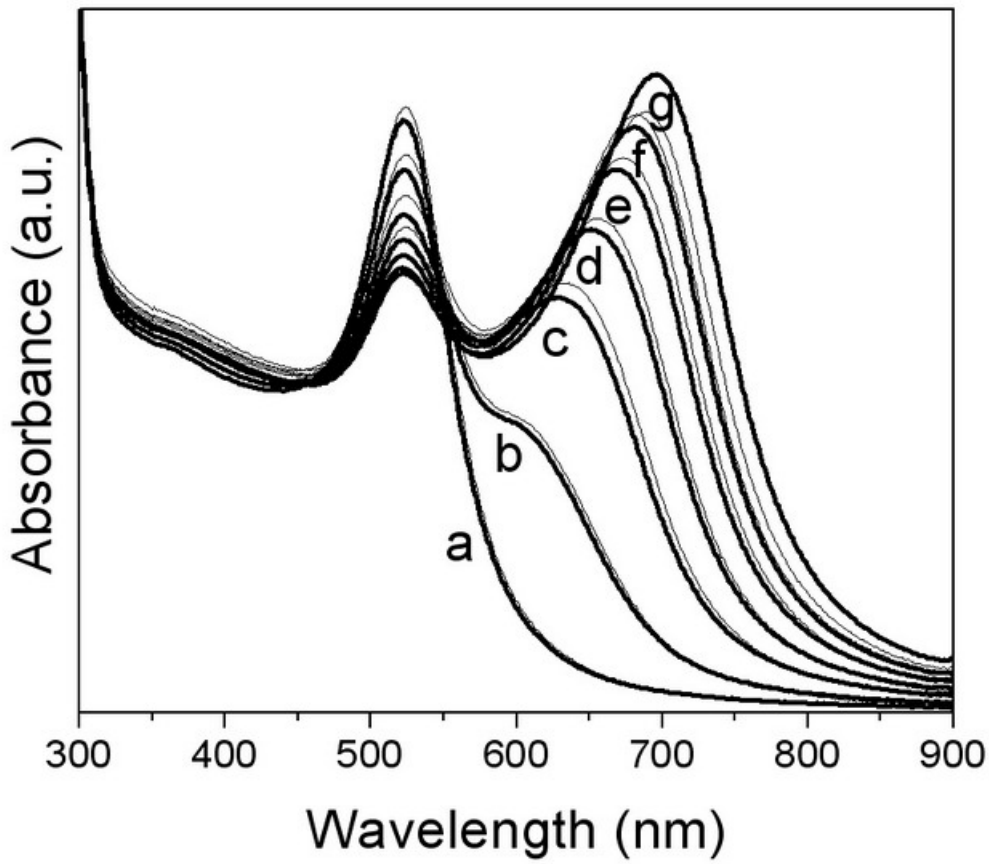

Figure S2. UV-Vis spectra of gold nanochains at 0 hr (black lines) and 12 days (grey lines) after addition of SDS (3.6 mM), for AuNPs samples that has incubated with aniline for 2 hrs (a), 4 hrs (b), 5 hrs (c), 6 hrs (d), 7 hrs (e), 8 hrs (f) and 10 hrs (g). After 12 days, these solutions of Figure 2a barely changed in terms of plasmon absorbance. For sample g (10 hrs incubation), some precipitate was observed after 12 days because of the long chain length.

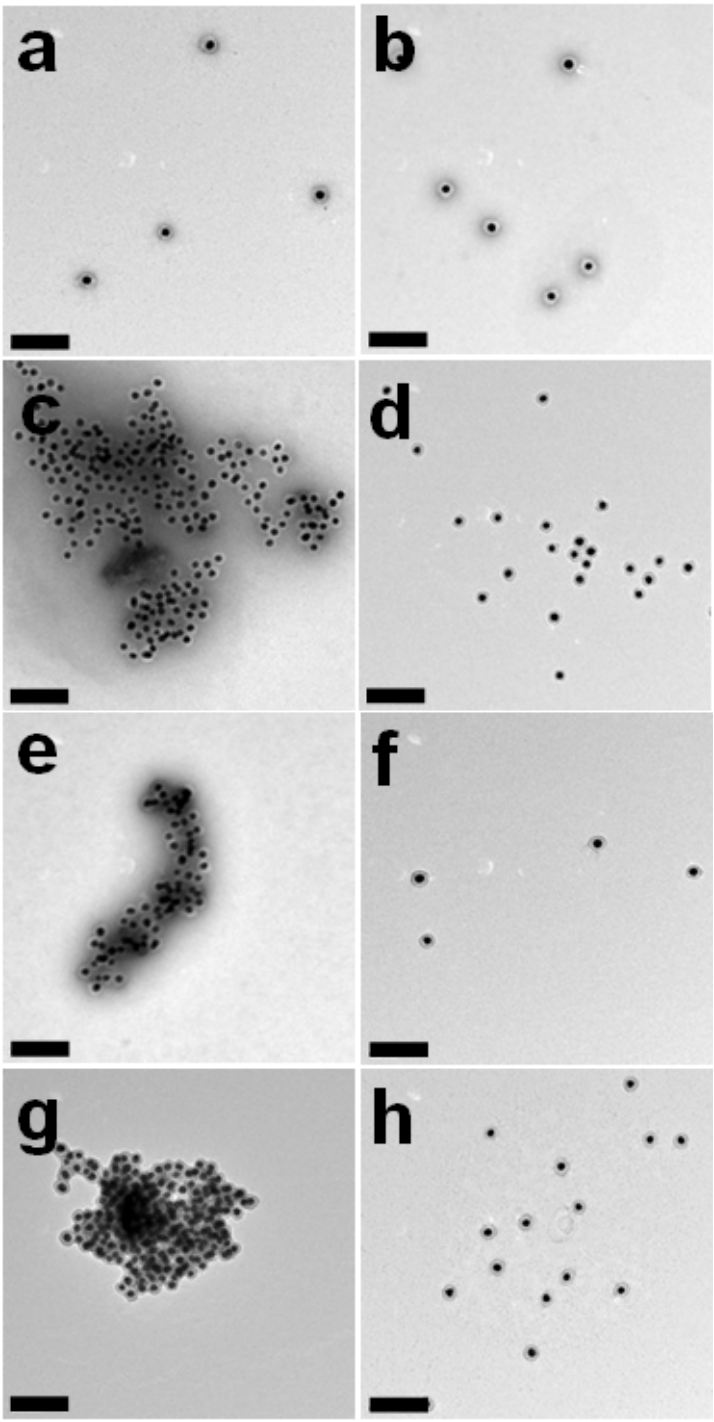

Figure S3. TEM images of isolated AuNP@PANI redispersed in either water (a, c, e, g) or SDS solution (3.6 mM, b, d, f, h), after the 1st, 2nd, 3rd and 4th centrifugation-resuspension cycle, respectively. Scale bars: 200 nm. After the 2nd cycle without SDS, insoluble precipitate has to be ultrasonicated for dispersion in water in order to prepare the TEM samples.

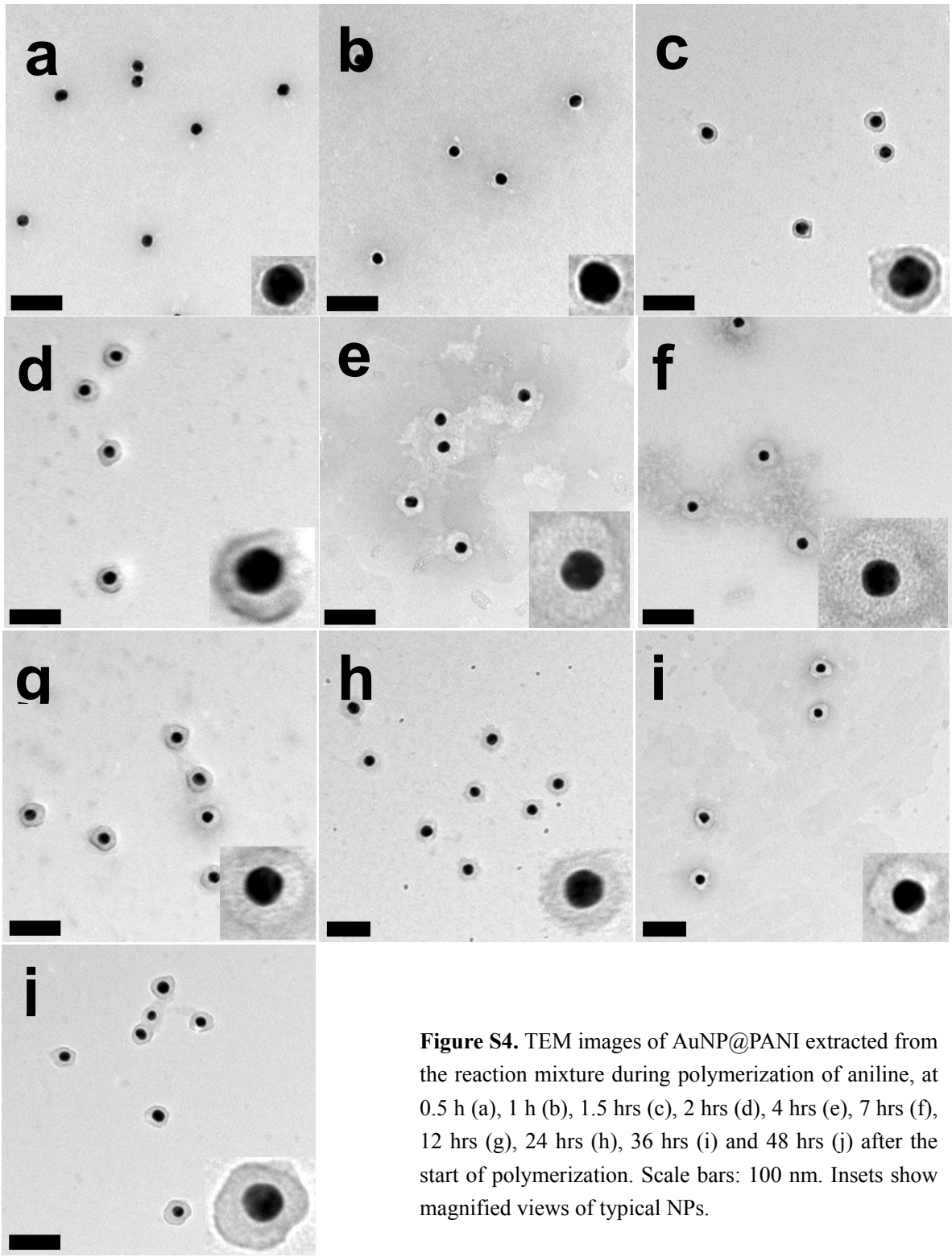

Figure S4. TEM images of AuNP@PANI extracted from the reaction mixture during polymerization of aniline, at 0.5 h (a), 1 h (b), 1.5 hrs (c), 2 hrs (d), 4 hrs (e), 7 hrs (f), 12 hrs (g), 24 hrs (h), 36 hrs (i) and 48 hrs (j) after the start of polymerization. Scale bars: 100 nm. Insets show magnified views of typical NPs.

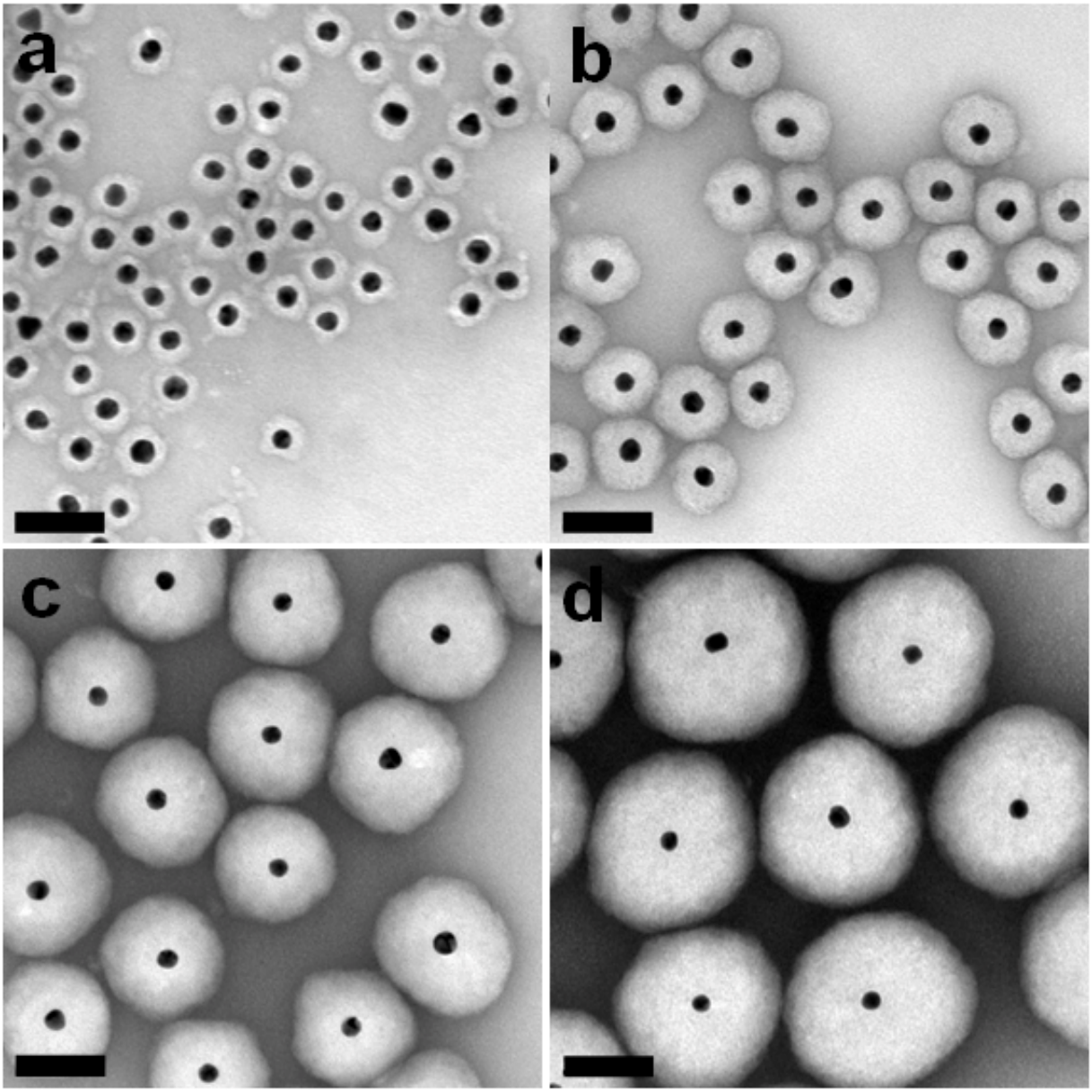

Figure S5. TEM images of AuNP@PANI after the 1st, 2nd, 3rd, and 4th growth cycle, respectively. Scale bars: 100 nm.

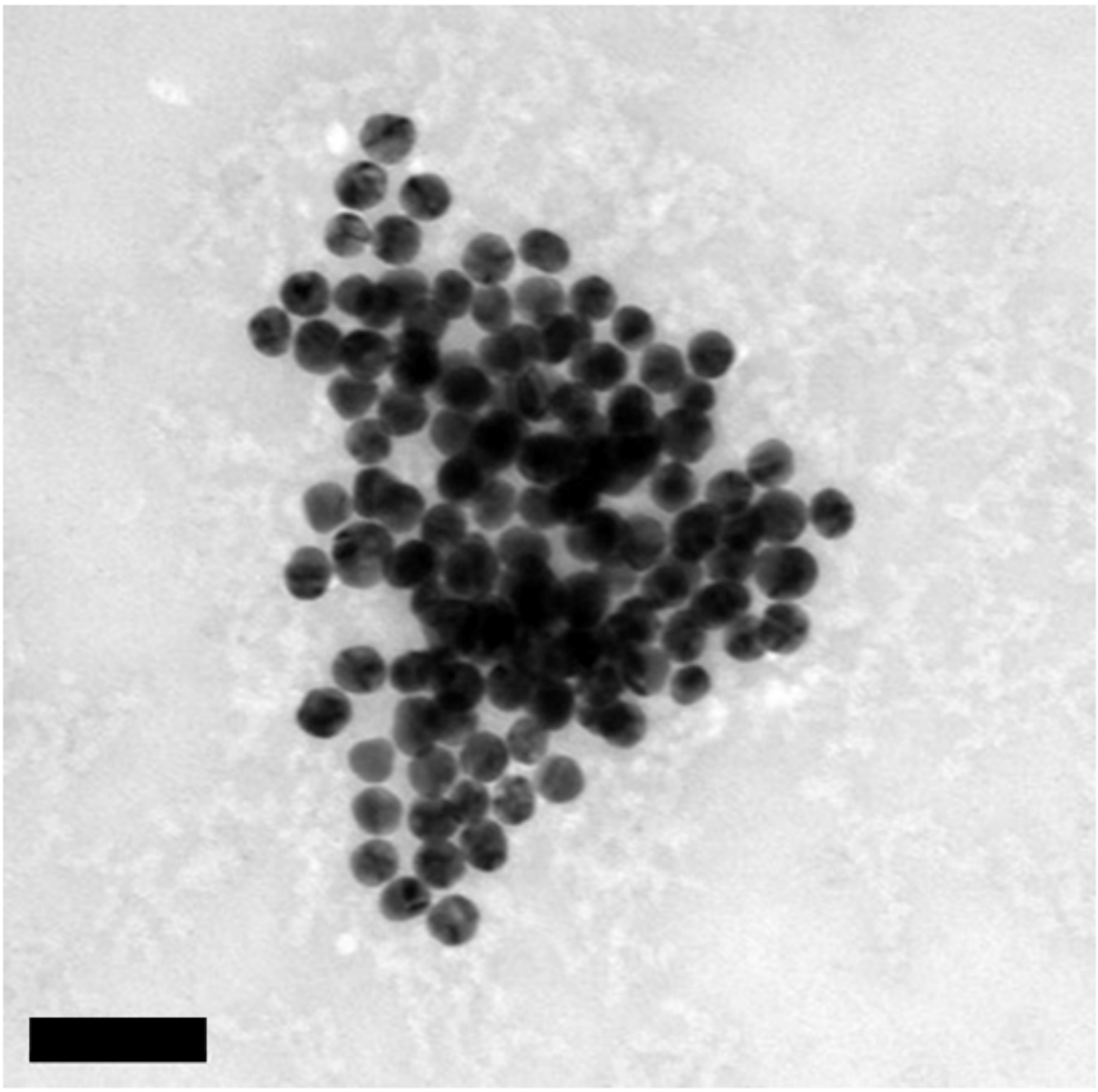

Figure S6. A typical TEM image of a control experiment that mixed citrate-AuNPs with pre-formed PANI in SDS solution. The AuNPs aggregated and no obvious polymer shell could be identified.

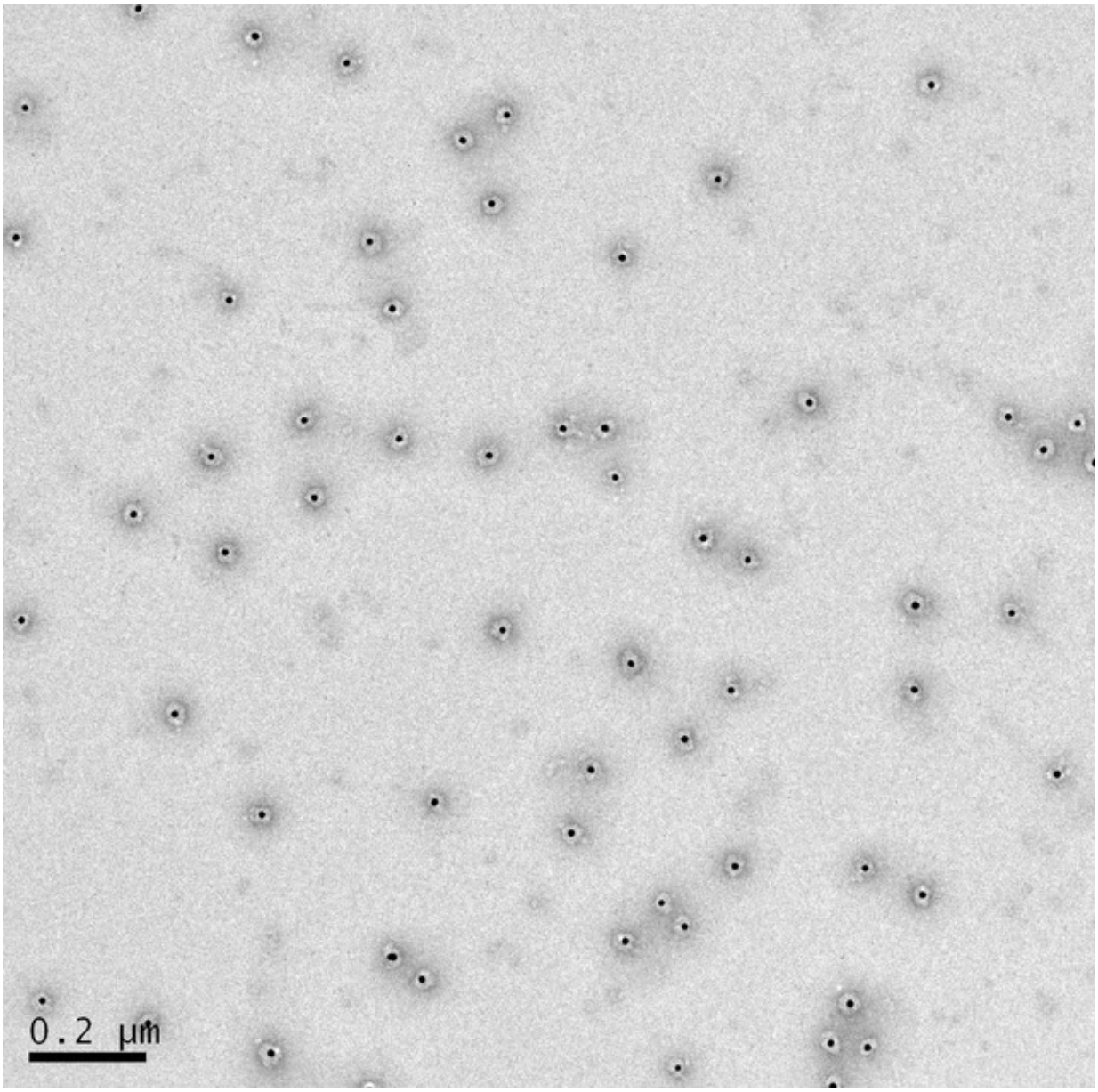

Figure S7. A typical TEM image of 10 nm AuNP@PANI.

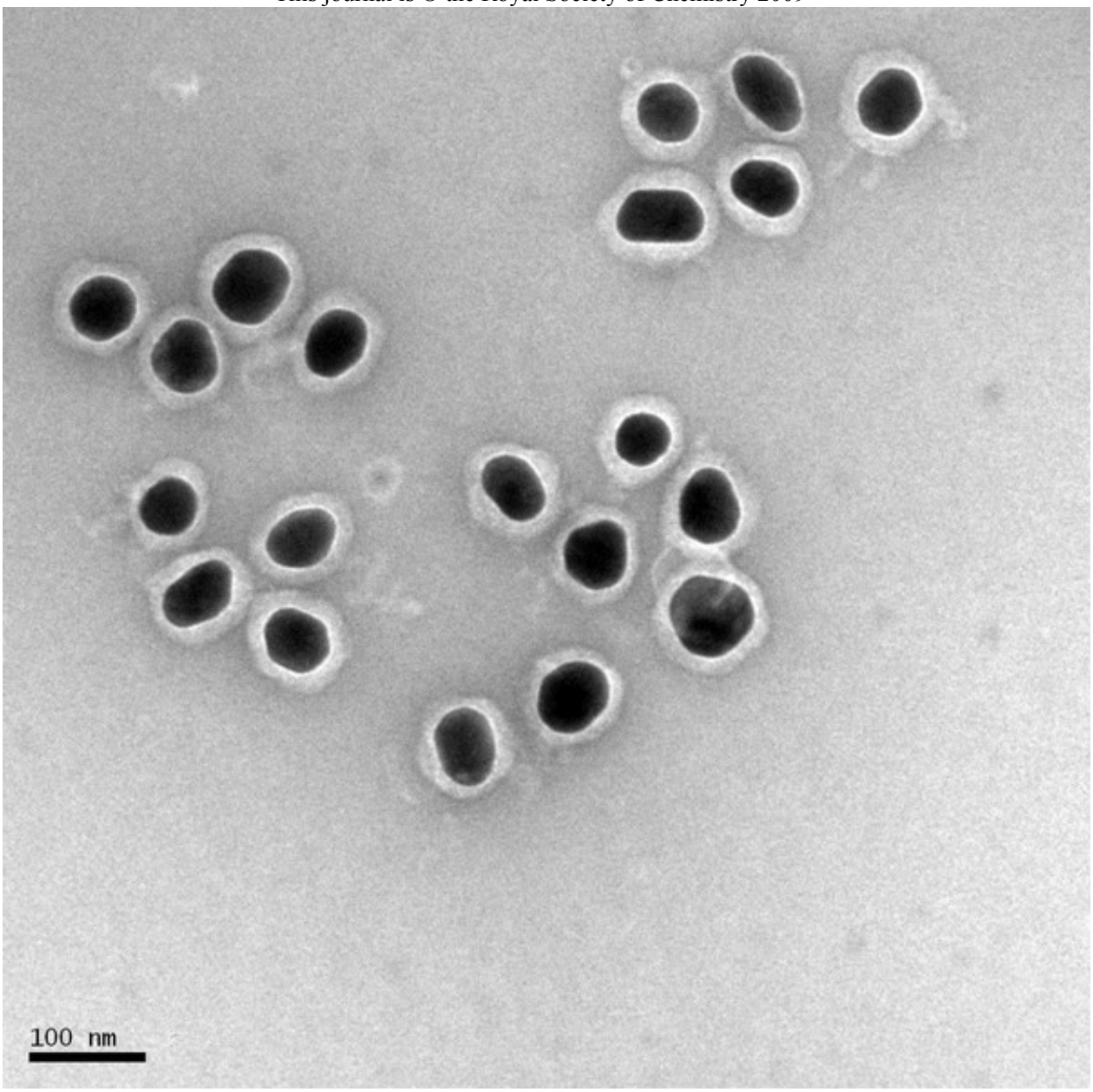

Figure S8. A typical TEM image of 60 nm AuNP@PANI.

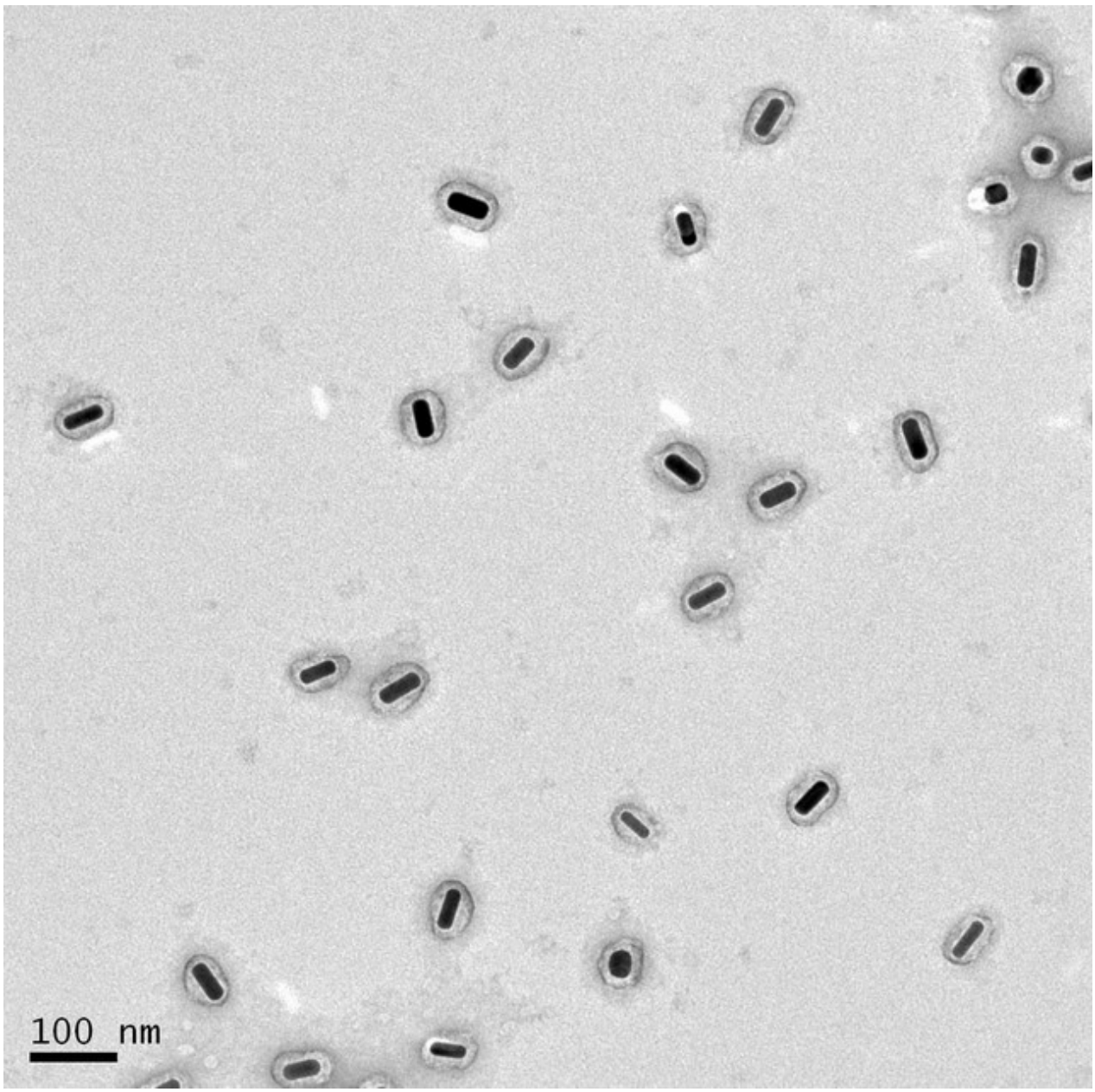

Figure S9. A typical TEM image of AuNR@PANI.

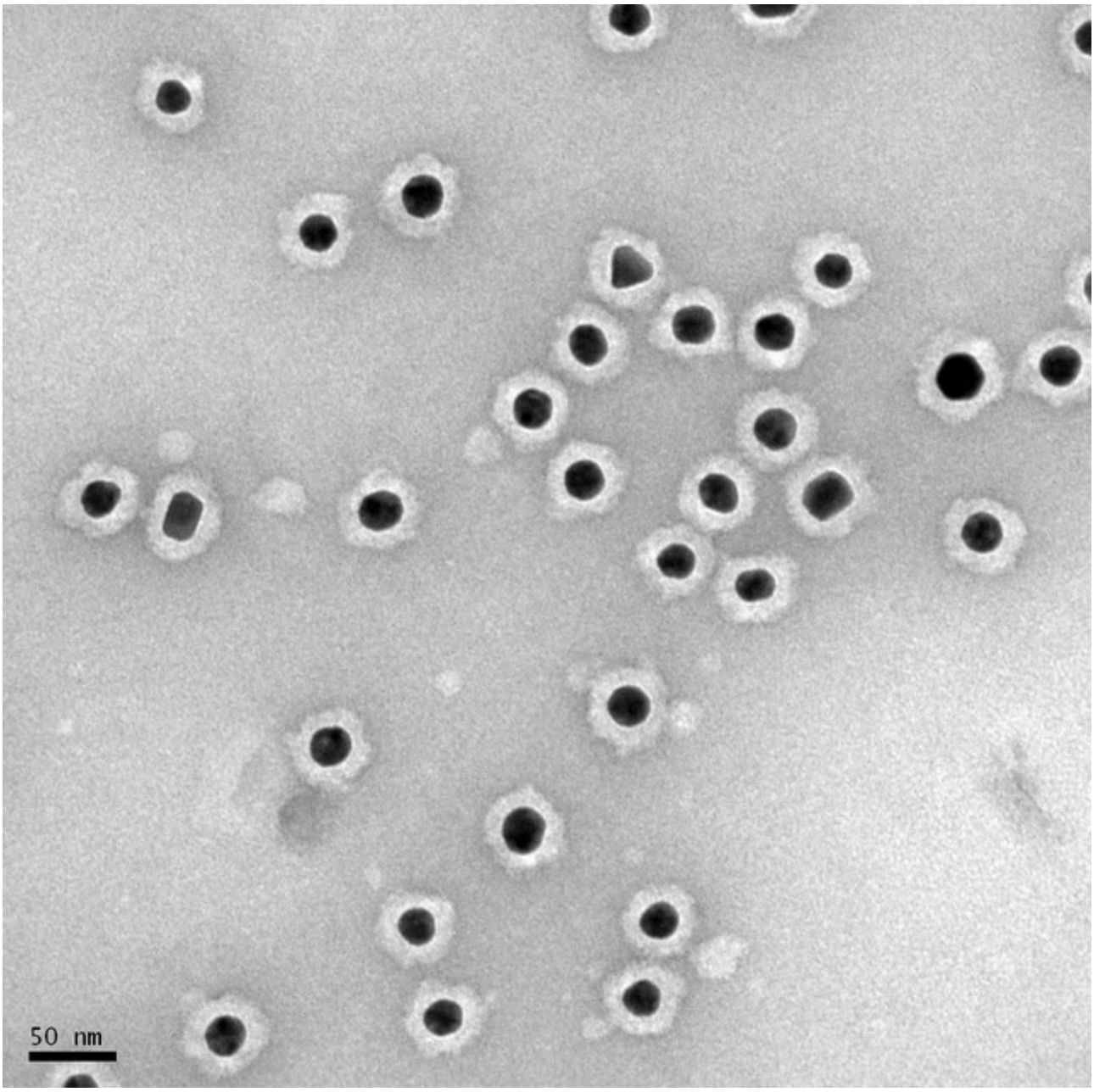

Figure S10. A typical TEM image of 22 nm AuNP@PPy.

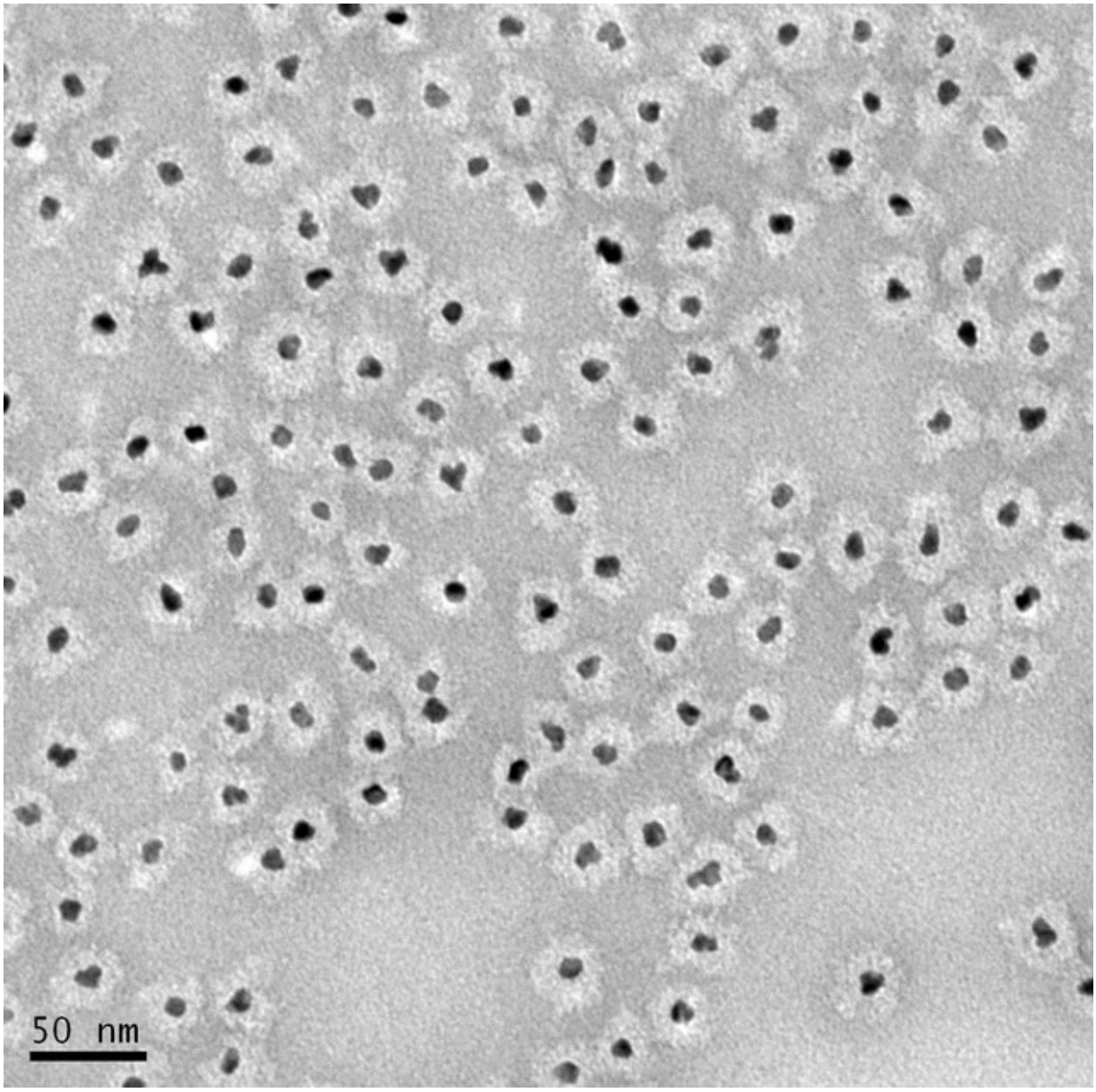

Figure S11. A typical TEM image of PtNP@PPy.

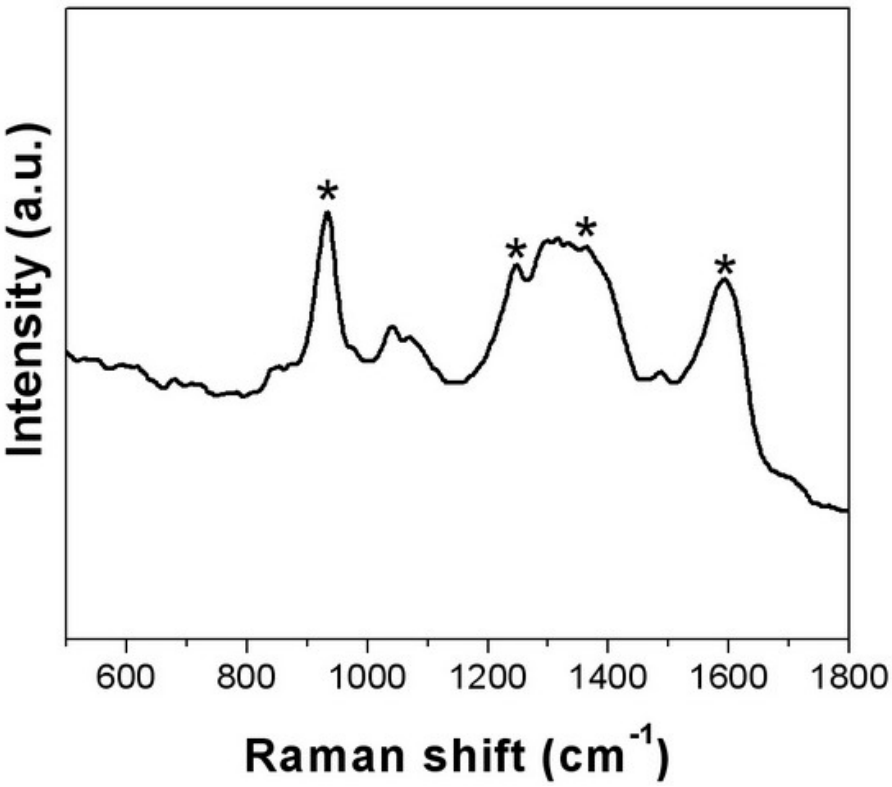

Figure S12. Raman spectrum of AuNP@PPy.