

Supporting Information

Polyelectrolyte Complex Particle-Based Multifunctional Freestanding Films Containing Highly Loaded Bimetallic Particles

Md Arifur Rahim^{ab}, Bora Nam^{ac}, Won San Choi^{d}, Ha-Jin Lee^{ab*}, and Il Cheol Jeon^{be}*

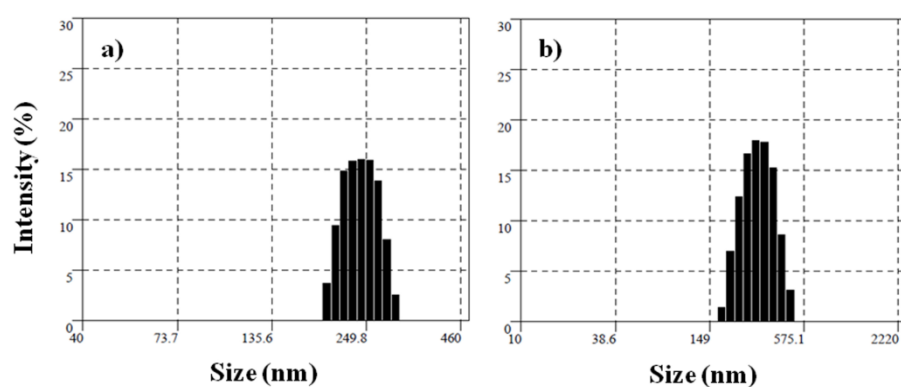


Fig. S1. DLS data for the particle size distribution of (a) nPEC(PEI₁-PAA_{0.45}) and (b) nPEC(PAH₁-PAA_{0.6}) in aqueous solution. Average particle sizes of the former and the latter were 245 nm and 268 nm, respectively.

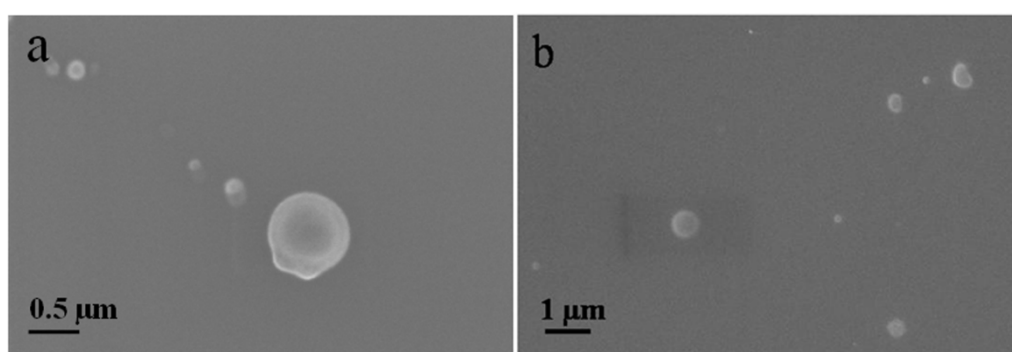


Fig. S2. FE-SEM micrographs of (a) nPEC(PEI₁-PAA_{0.45}) and (b) nPEC(PAH₁-PAA_{0.6}).

They showed spherical shapes with size ranging from 150 nm to 800 nm.

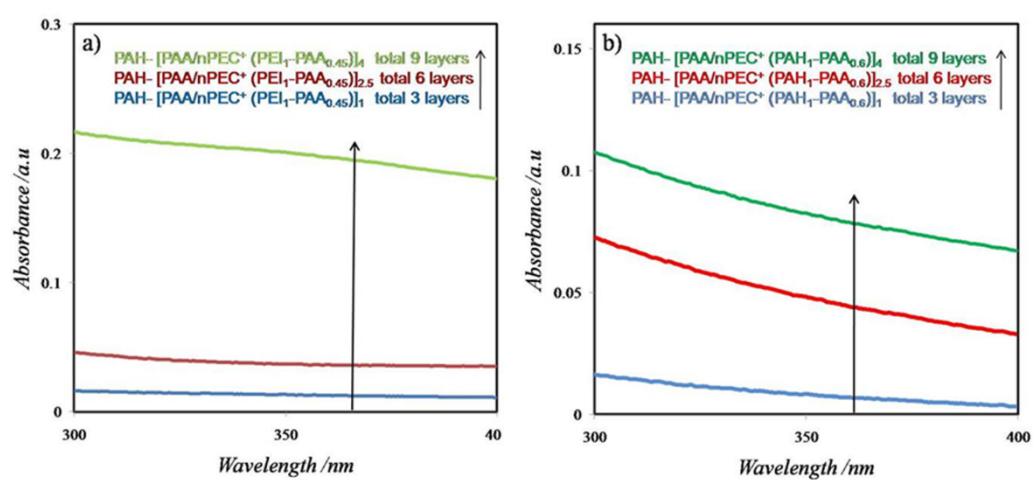


Fig. S3. UV-vis absorption spectra showing the layer growth of (a) PAH-[PAA/nPEC(PEI₁-PAA_{0.45})]_n pristine film and (b) PAH-[PAA/nPEC(PAH₁-PAA_{0.6})]_n pristine film. Here n after the brackets stands for number of layers.

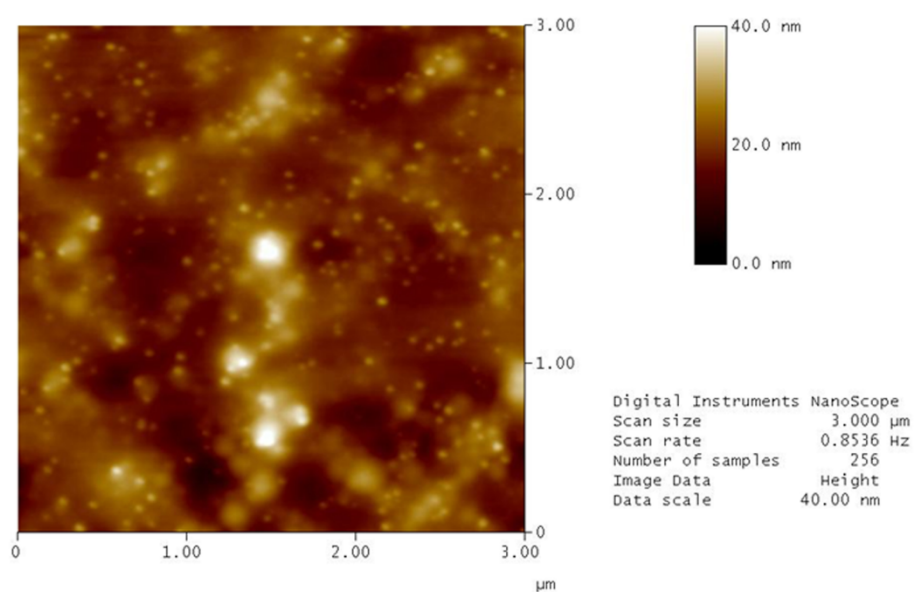


Fig. S4. AFM image of the nPEC(PAH₁-PAA_{0.6}) film which was heat-treated under 200 °C for 1 hour before measurement. As a result, tiny particles were formed even in the absence of metal precursors.

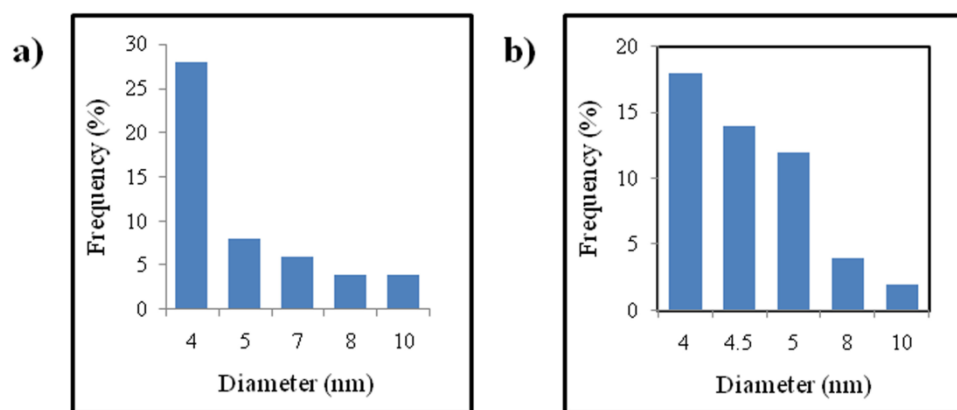


Fig. S5. Histograms showing the size distributions of metal NPs in the (a) (PAH-[PAA/nPEC(PEI₁-PAA_{0.45})]₄)-Au-Ag film and (b) PAH-[PAA/nPEC(PAH₁-PAA_{0.6})]₄)-Au-Ag film. 50 particles are counted from UHR-FE-SEM micrographs.

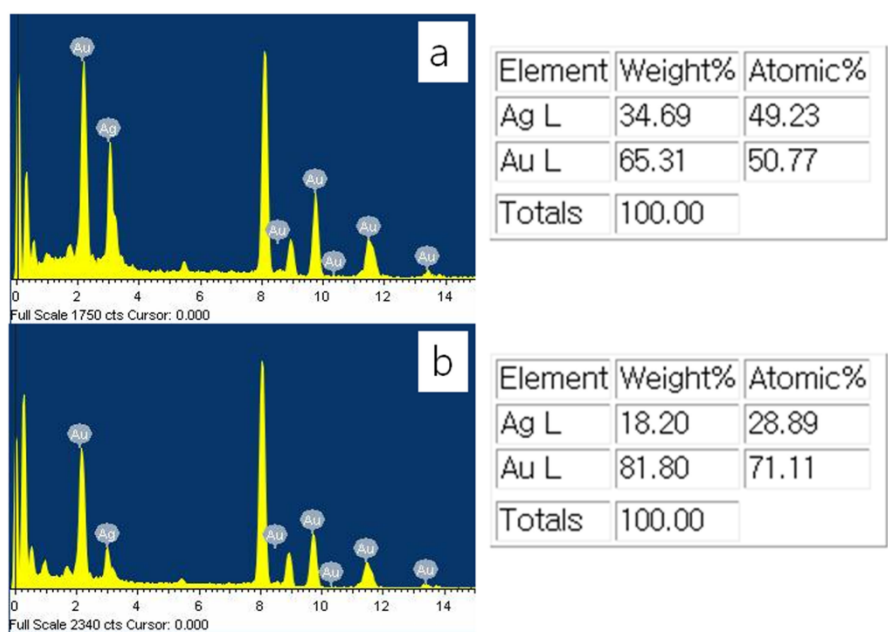


Fig. S6. EDX analyses showing the existence of Au and Ag in (a) PAH-[PAA/nPEC⁺(PEI₁-PAA_{0.45})]₄-Au-Ag film and (b) PAH-[PAA/nPEC⁺(PAH₁-PAA_{0.6})]₄-Au-Ag film.

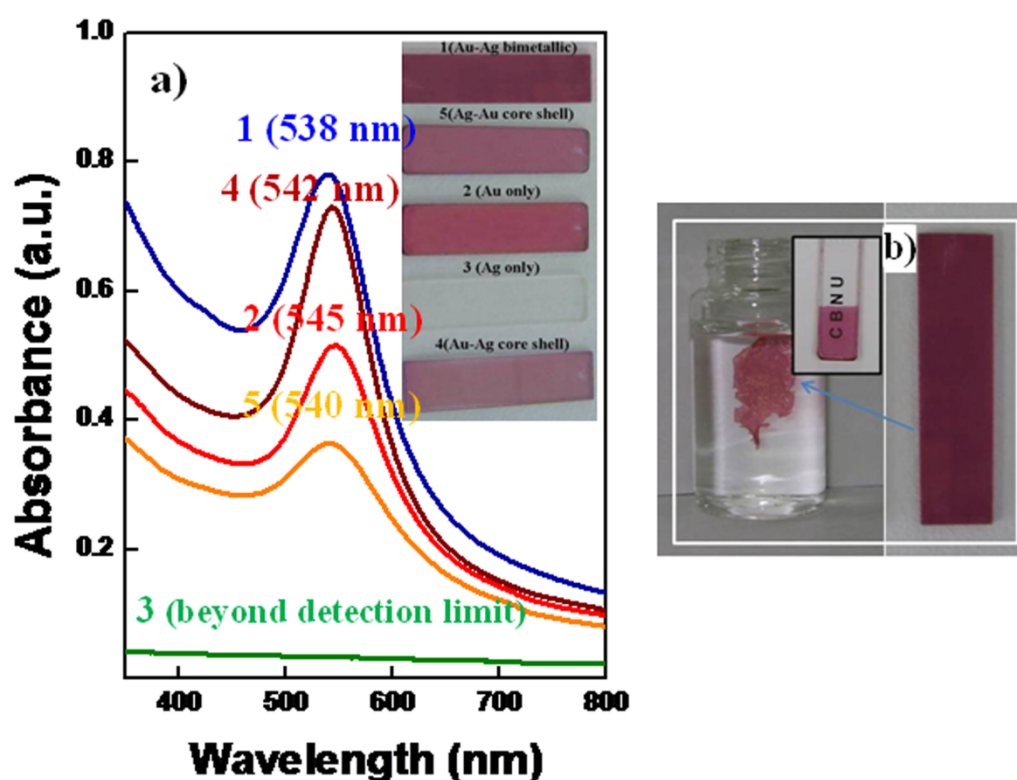


Fig. S7. (a) UV-vis absorption spectra of the composite films where different types of metal NPs are embedded; Data for PAH-[PAA/nPEC⁺(PAH₁-PAA_{0.6})]₄-Au-Ag film. The corresponding insets present the color variation of the composite films prepared by our method. (b) Photographs of PAH-[PAA/nPEC⁺(PAH₁-PAA_{0.6})]₄-Au-Ag film on quartz substrate (Both side coatings of substrate) and the corresponding freestanding film in water after exfoliation from substrate. Transparency of the composite film was achieved by one side coating of substrate (Inset).