Supplementary Information

Ultra-low loadings of gold nanoparticles significantly boost capacitive energy storage of multilayer polymer composites

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The calculation method of the volume fraction of Au nanoparticles is as follows: P(VDF-HFP) and PMMA samples were cut into circular films with a radius of 1 cm, the thickness of the polymer film as d, the volume of polymer film is V_1, $V_1=\pi d$. The mass of P(VDF-HFP) is m_1, the mass of P(VDF-HFP) after sputtering is m_2, the density of gold nanoparticles is 19.32 g/cm^3, the volume of gold nanoparticles is V_2, $V_2=(m_2-m_1)/19.32$, the volume fraction of gold nanoparticles is Au vol%, Au vol%$=V_2/(V_1+V_2)$.

The surface SEM images and the size distribution of the Au NPs for the composite films. Gold nanoparticles are uniformly distributed with a size of about 6-10 nm with gold sputtering times of 4 min.

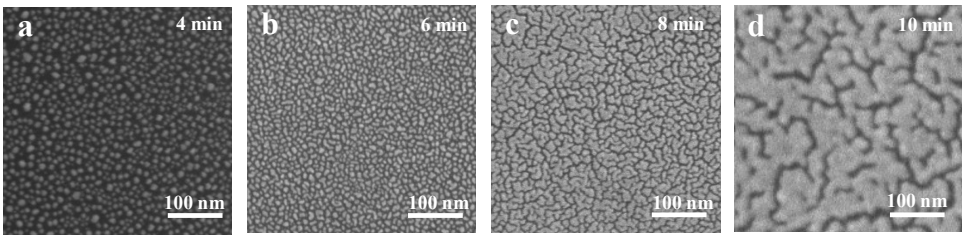

Fig. S1. The surface SEM image of P(VDF-HFP) films with different gold sputtering times.

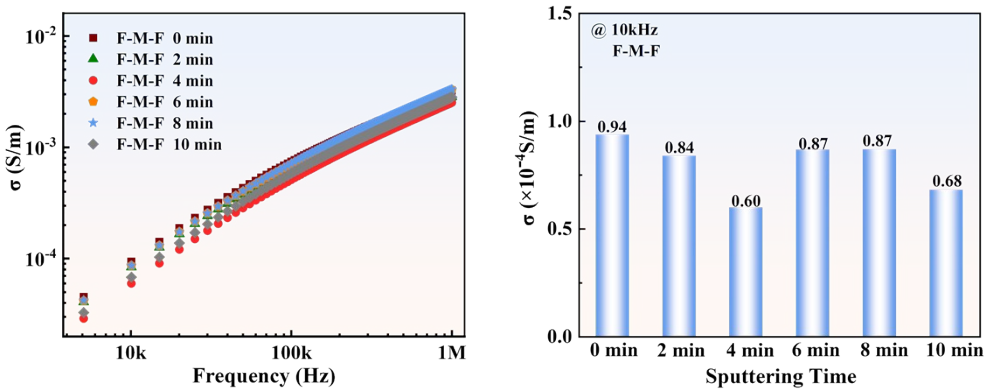

Fig. S2 Frequency dependence of F-M-F films conductivity with different gold sputtering times.

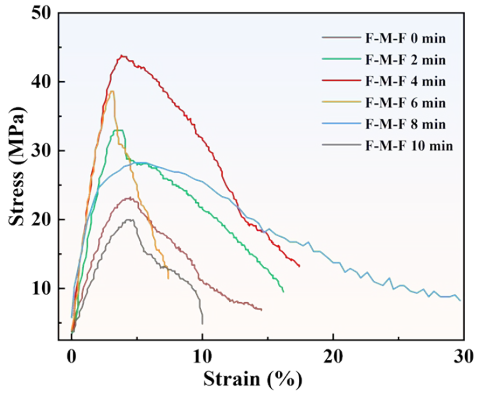

Fig. S3 Strain-stress curves of F-M-F films with different gold sputtering times.

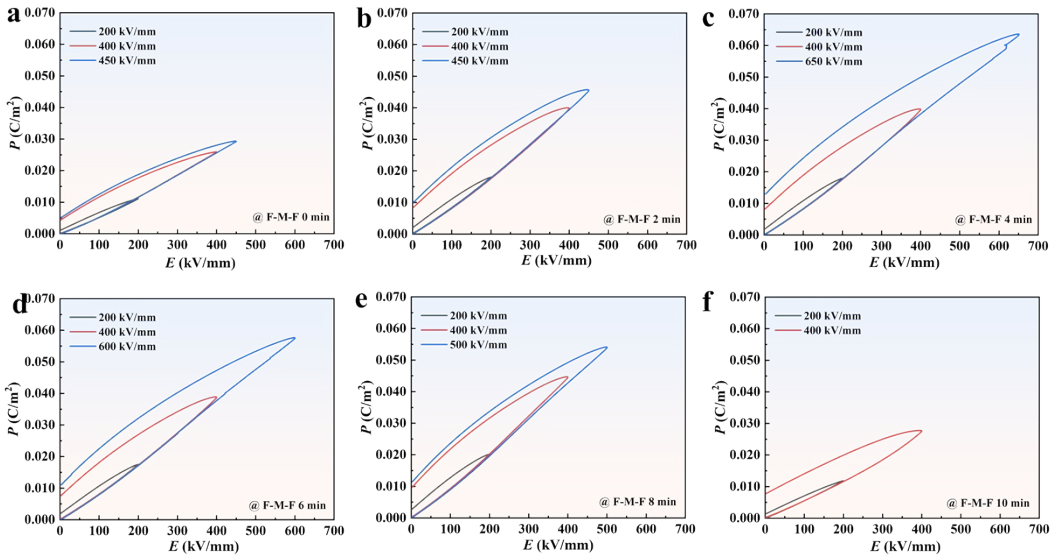

Fig. S4 *D-E* loops of F-M-F films with different gold sputtering times.