Electronic Supplementary Material (ESI) for RSC Advances.

Electro-active Amphiphilic Copolymer Micelle Noncovalently Functionalized Multiwalled Carbon Nanotubes for Selective Dopamine Detection

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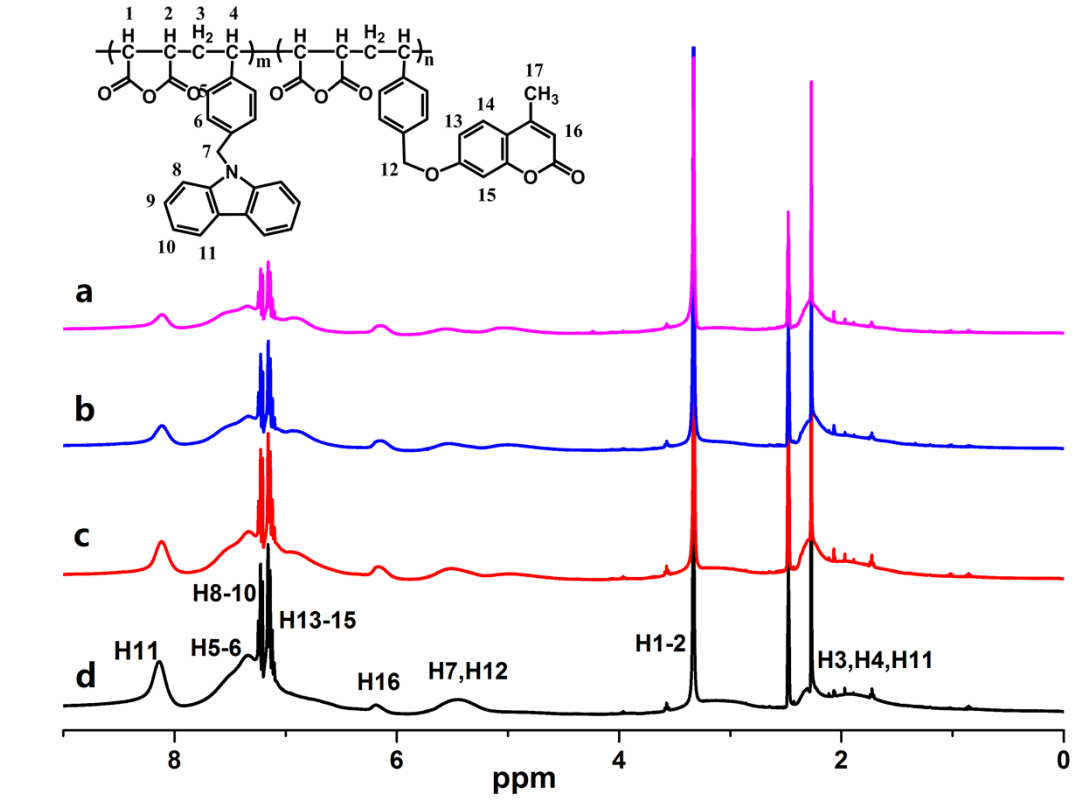

Figure S1. ^{1}H NMR spectra of P(Vm/VCz-alt-Ma): (a)EAC0, (b)EAC1, (c)EAC2, (d)EAC3.

The multi peaks at 7.0-7.7 ppm were assigned to the aromatic protons from Vm and VCz. Chemical shift at 3.3 ppm was assigned to the protons from Ma. The broad peak around 5.2 ppm was assigned to the protons of -CH_2- in Vm and VCz.

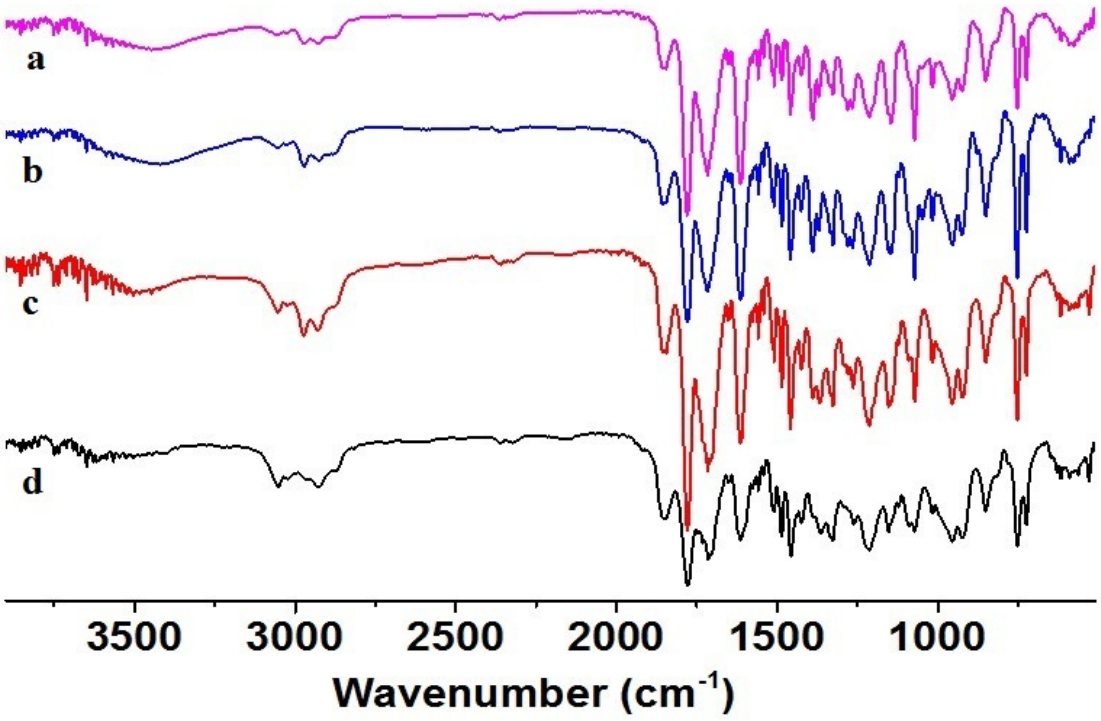

Figure S2. FTIR spectra of P(Vm/VCz-alt-Ma): (a)EAC0, (b)EAC1, (c)EAC2, (d)EAC3.

The absorbance band at ~1265 cm^{-1} was from C-N bonds in carbazole moieties. The absorbance bands at 1858 and 1790 cm^{-1} could be attributed to the C=O bonds in maleic anhydride. Whereas, the absorbance band at 1722 cm^{-1} was related to the carboxylic groups from inner ester in coumarin and hydrolysis of maleic anhydride.

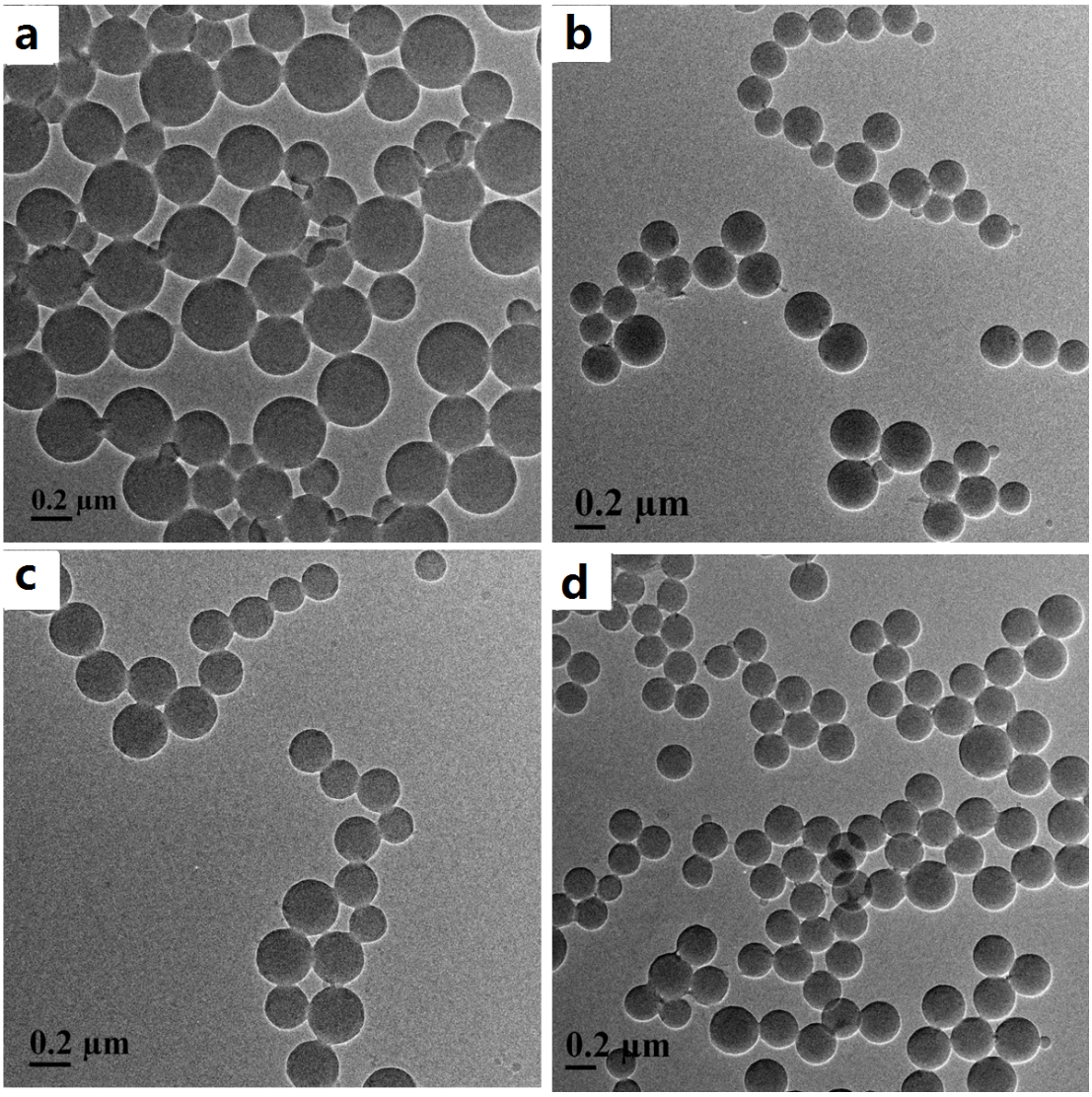

Figure S3. TEM images of the copolymer micelles: (a)EACM0, (b)EACM1, (c)EACM2, (d)EACM3

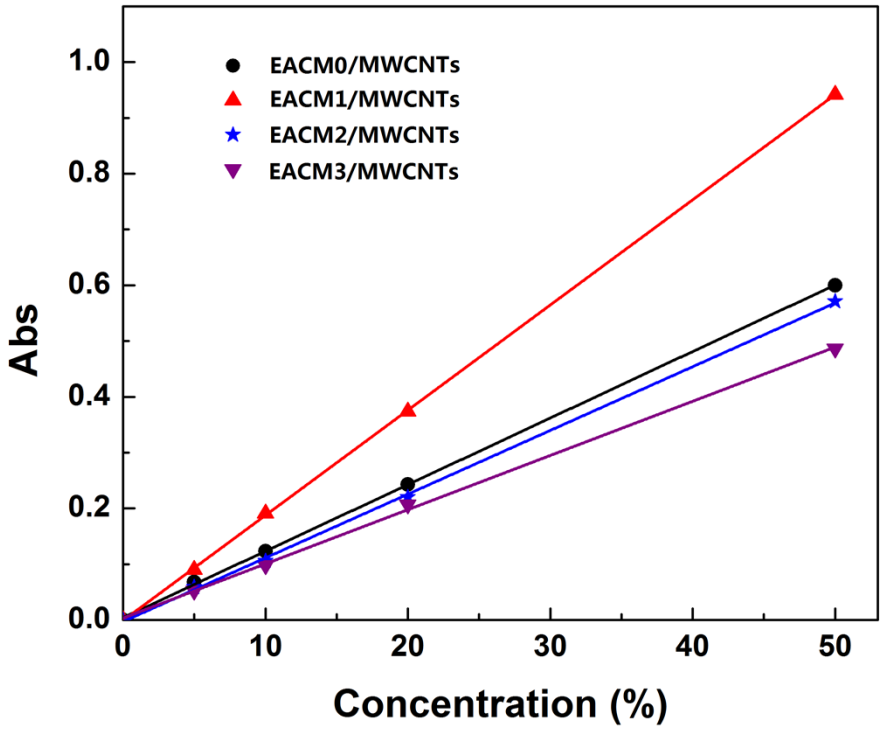

Figure S4. The relationship between the concentration of EAC/MWCNTs and absorbance at 500 nm.

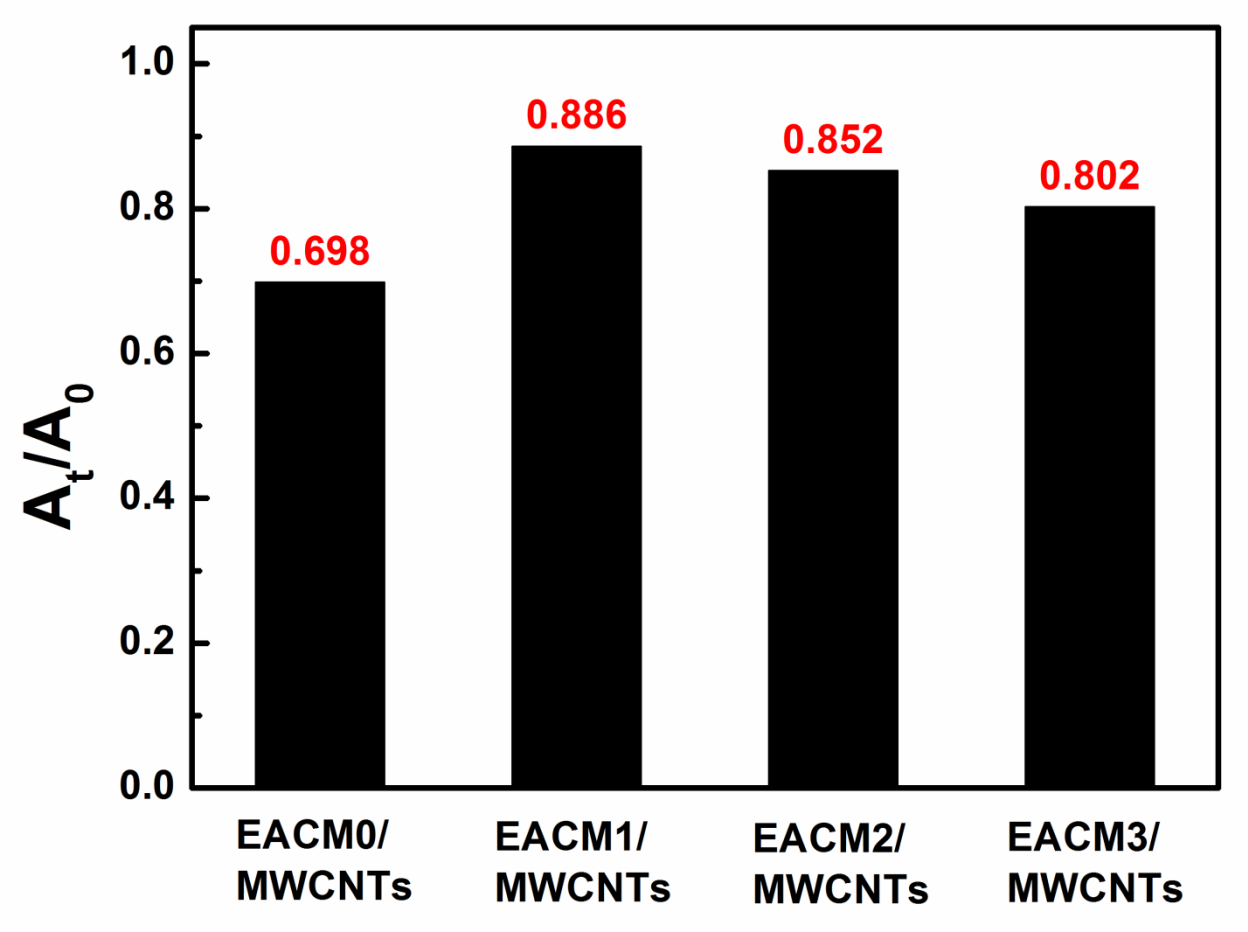

Figure S5. Dispersion stability of EACM/MWCNTs after photo-crosslinking.

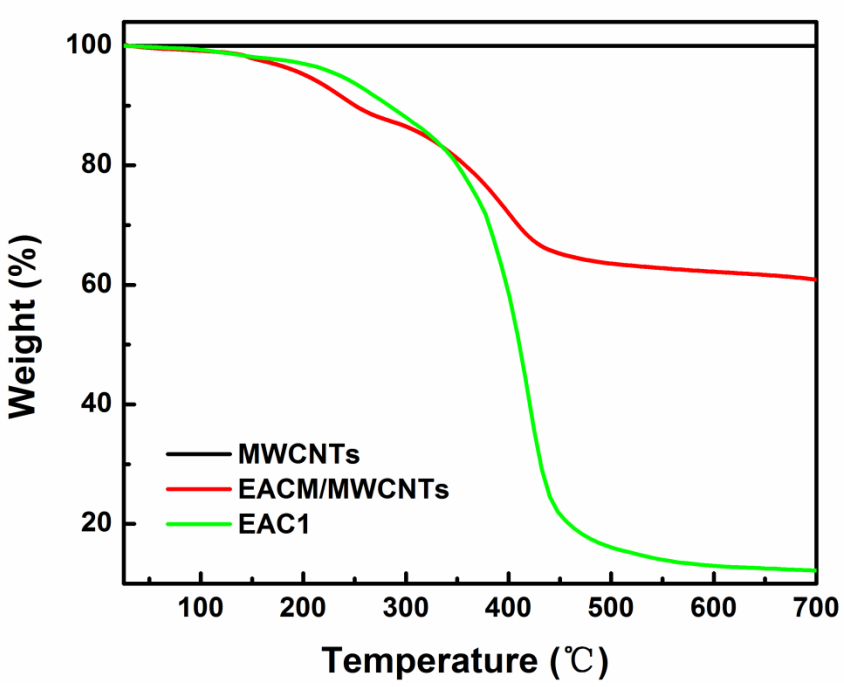

Figure 6. TGA curves of pristine MWCNTs, EAC1 copolymer, EACM/MWCNTs hybrid.

TGA experiments were carried out to measure the content of EACM adsorbed on the MWCNTs surface. For pristine MWCNTs, no weight loss was observed up to 700°C. The main decomposition behavior of EAC1 copolymer occurs in the range of 105–460°C with a weight loss of 82%. In the same temperature range, the sample of EACM/MWCNTs hybrid lost about 40%. The EACM1 contents (mass percent) in EACM1/MWCNTs sample calculated by TGA was 43.4%. Such results indicated the great affinity of EACM for the MWCNTs surface.

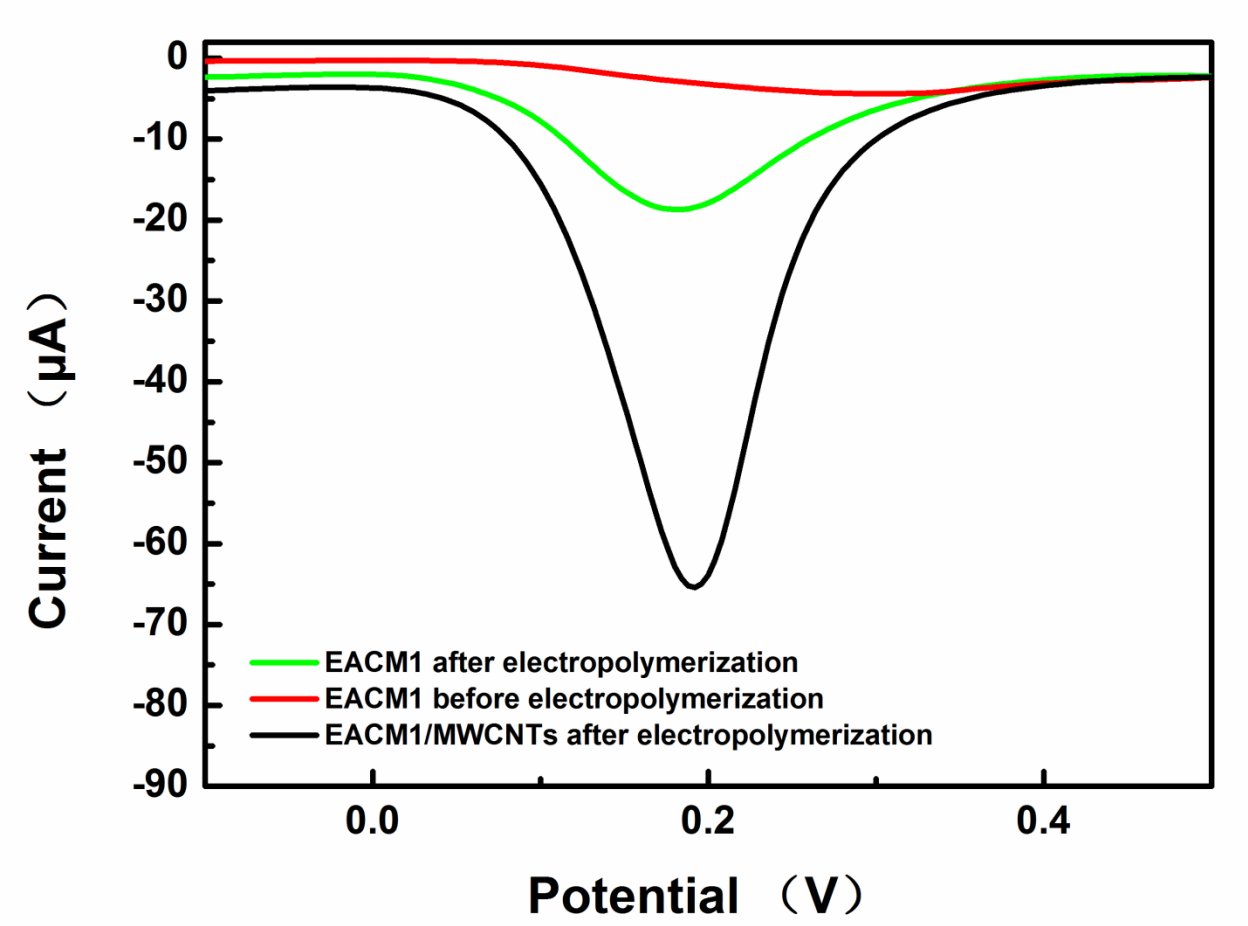

Figure S7. DPV of 1000 μM DA on an EACM1 modified GCE before (red) and after (green) electropolymerization and DPV of 1000 μM DA on an EACM1 modified GCE after electropolymerization (black).

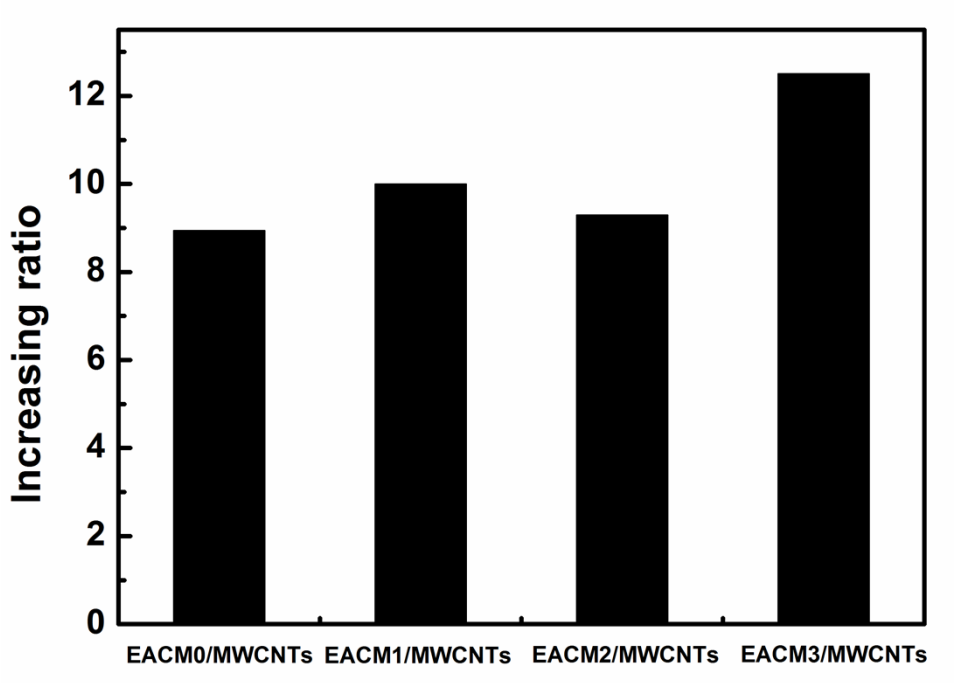

Figure S8. The increasing ratios of peak currents for 100 μM DA using EACM/MWCNTs with different content of carbazole modified GCE after carbazole moieties electropolymerized.

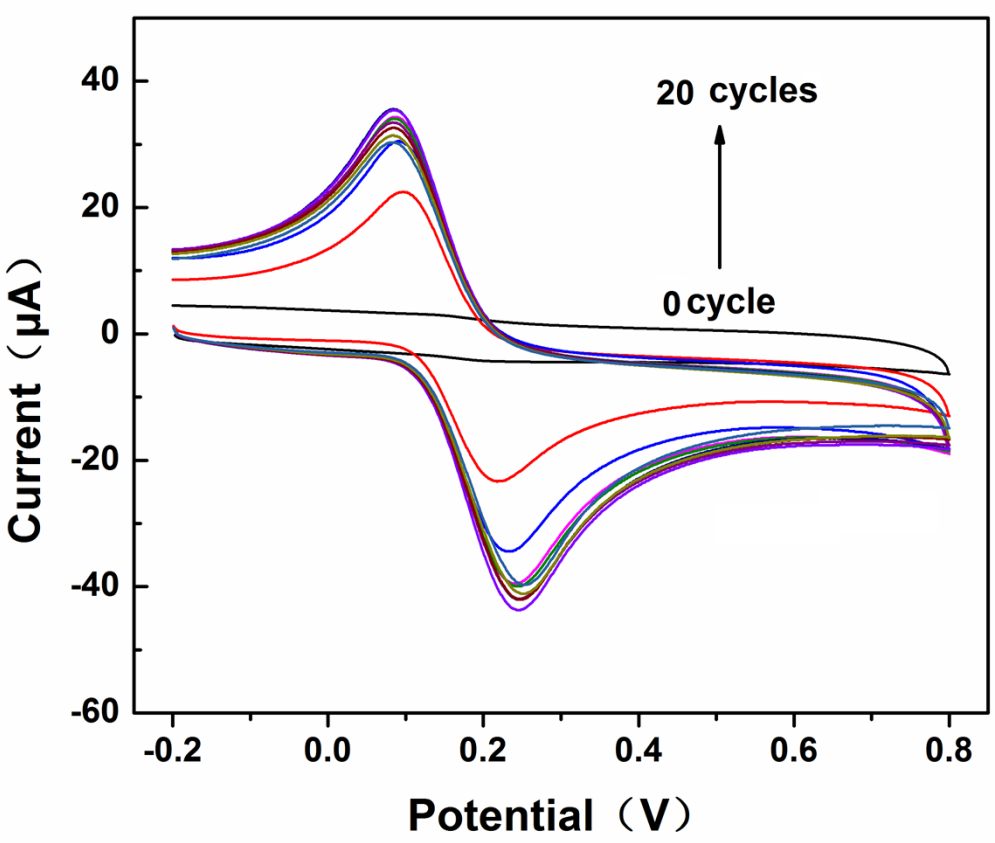

Figure S9. CV of the EACM/MWCNTs modified GCE in 100 μM DA solution with carbazole moieties electropolymerization (range from 0 to 20 cycles).