Supporting Information

Hierarchical Nafion Enhanced Carbon Aerogels for Sensing Applications

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Keywords: Carbon aerogels, Nafion, Sensing, Dopamine detection, Vapor sensor

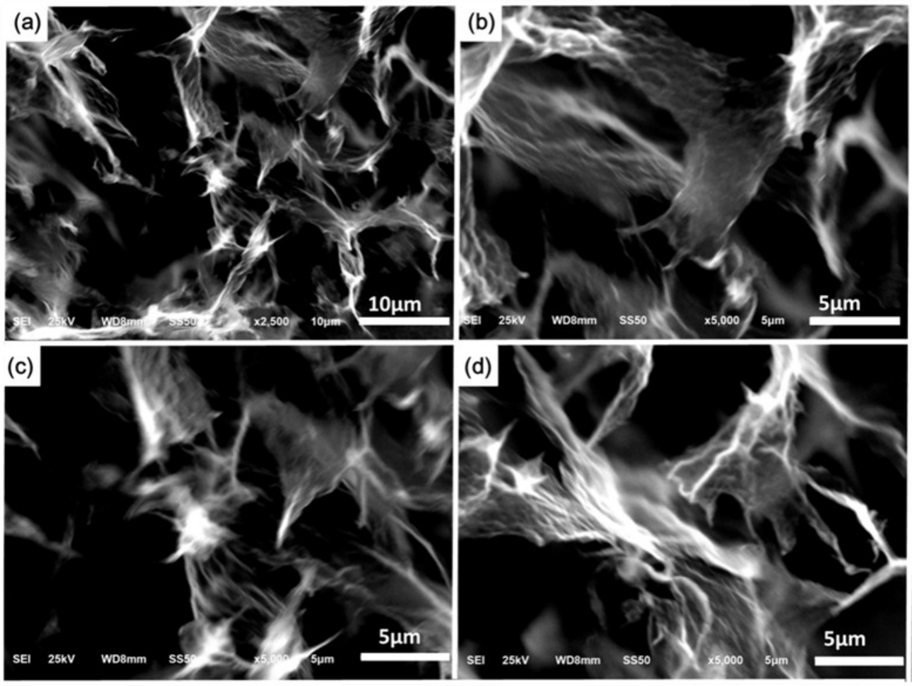


Figure S1. High magnification SEM images of NECAG without Nafion (GO: MWNTs=2: 1).

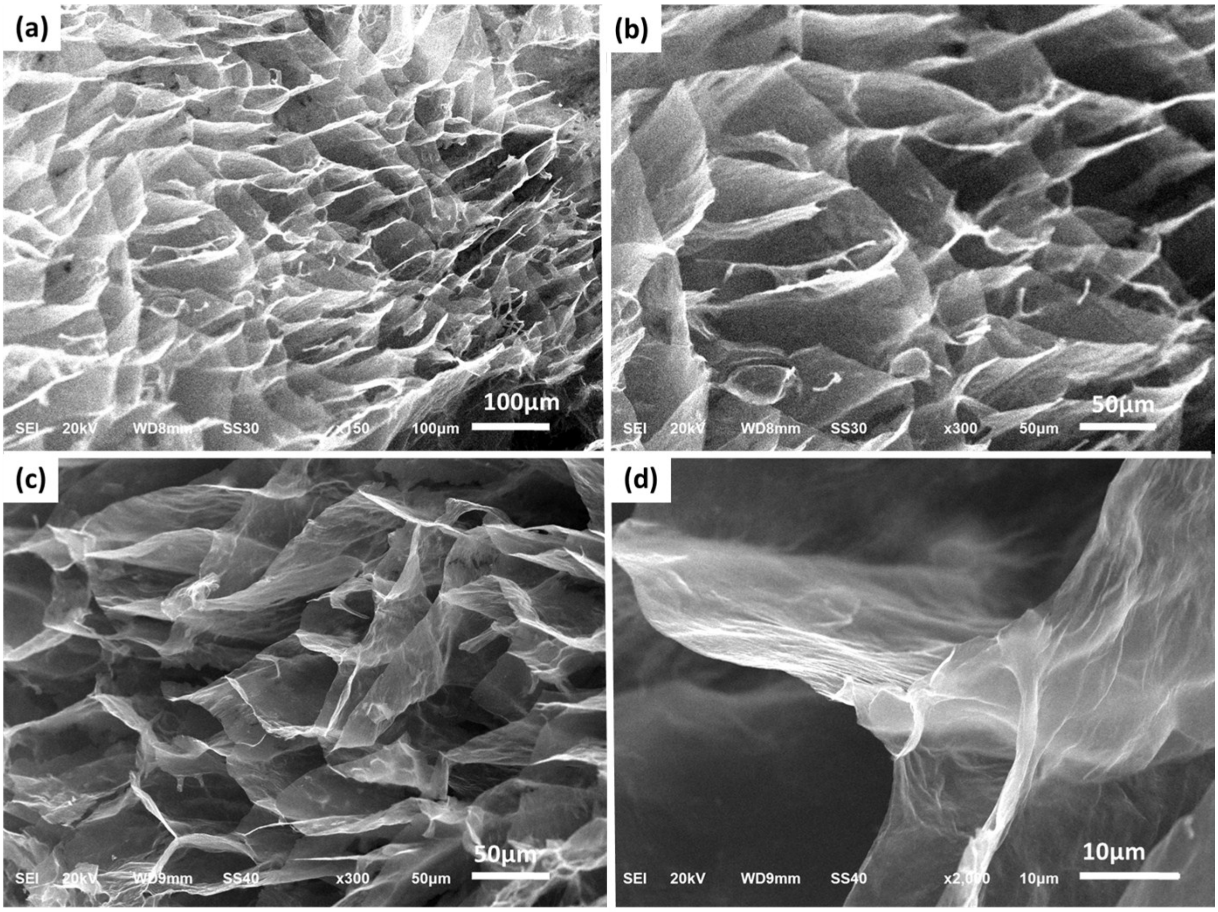


Figure S2. SEM images of highly ordered NECAG monoliths (C/Nafion = 3:1).

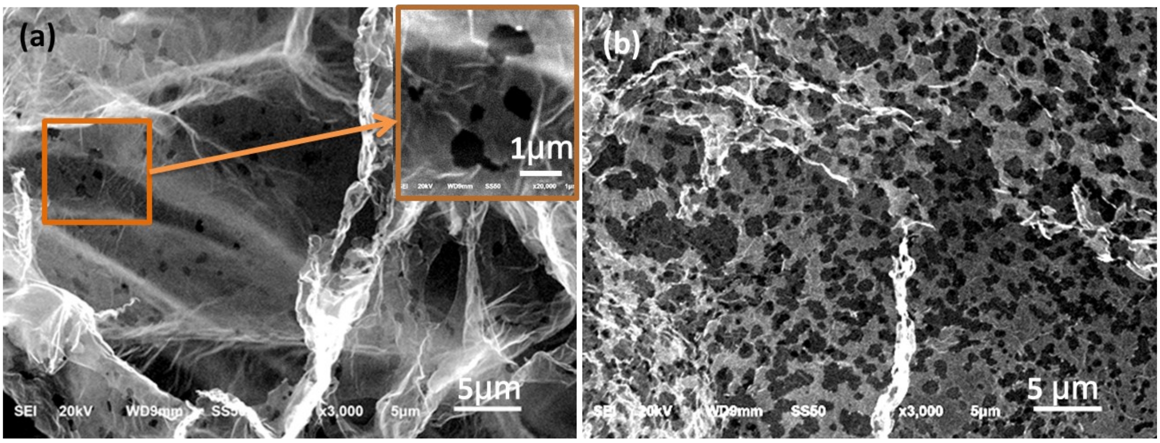


Figure S3. SEM images of NECAGs with various Nafion loadings. C/Nafion = (a) 10:1; (b) 3:1 Samples were annealed at 600 °C and the GO/MWCNTs ratio is 2:1.

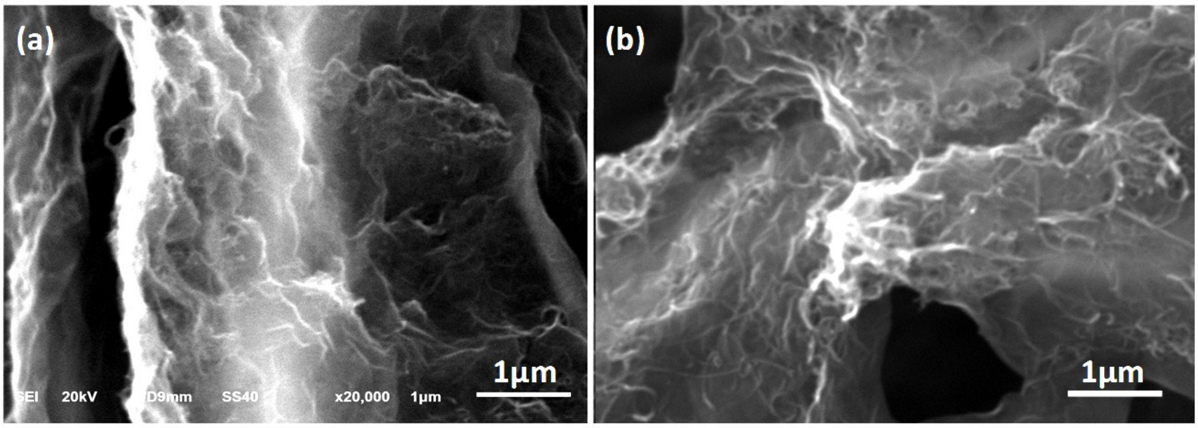


Figure S4. SEM images of MWCNTs on the cell walls of NECAG (C/Nafion = 3:1, annealed at 600 °C for 5h)

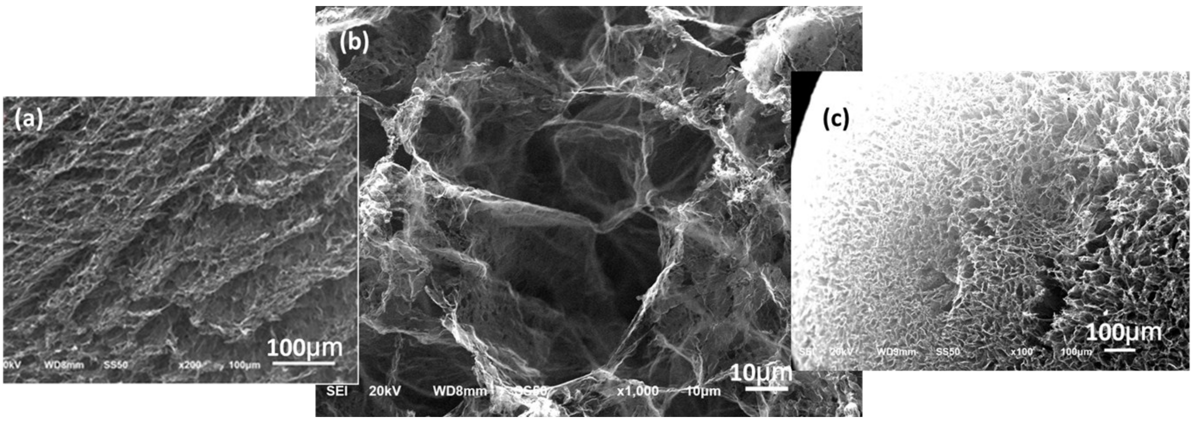


Figure S5. SEM images of the internal morphology of various NECAGs reduced at 600°C: (a) without Nafion; (b-c) C/Nafion = 3:1.

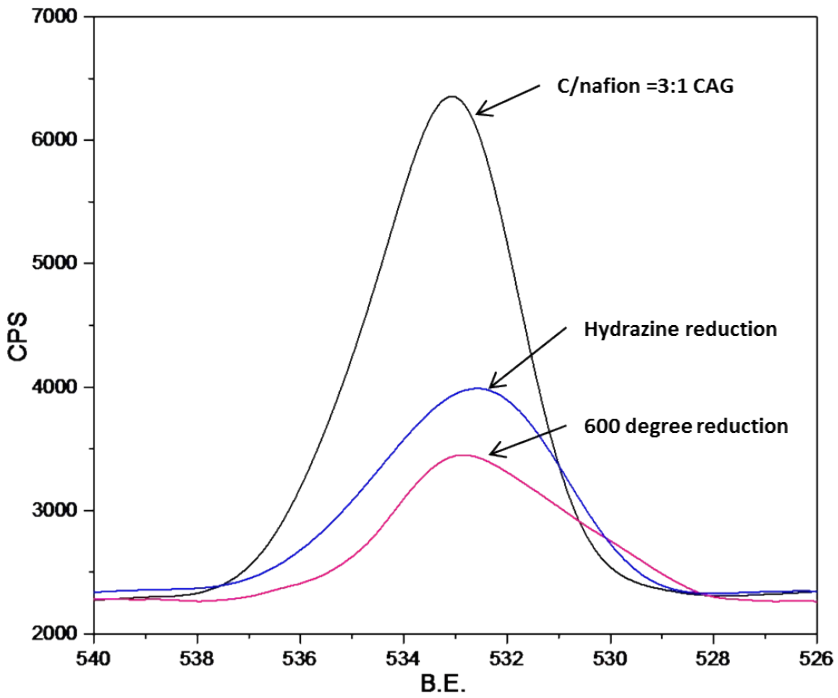


Figure S6. Typical O1s spectra of NECAG under various reduction conditions (C/Nafion = 3:1)

Figure S7. Experimental set-up for gas sensing measurement

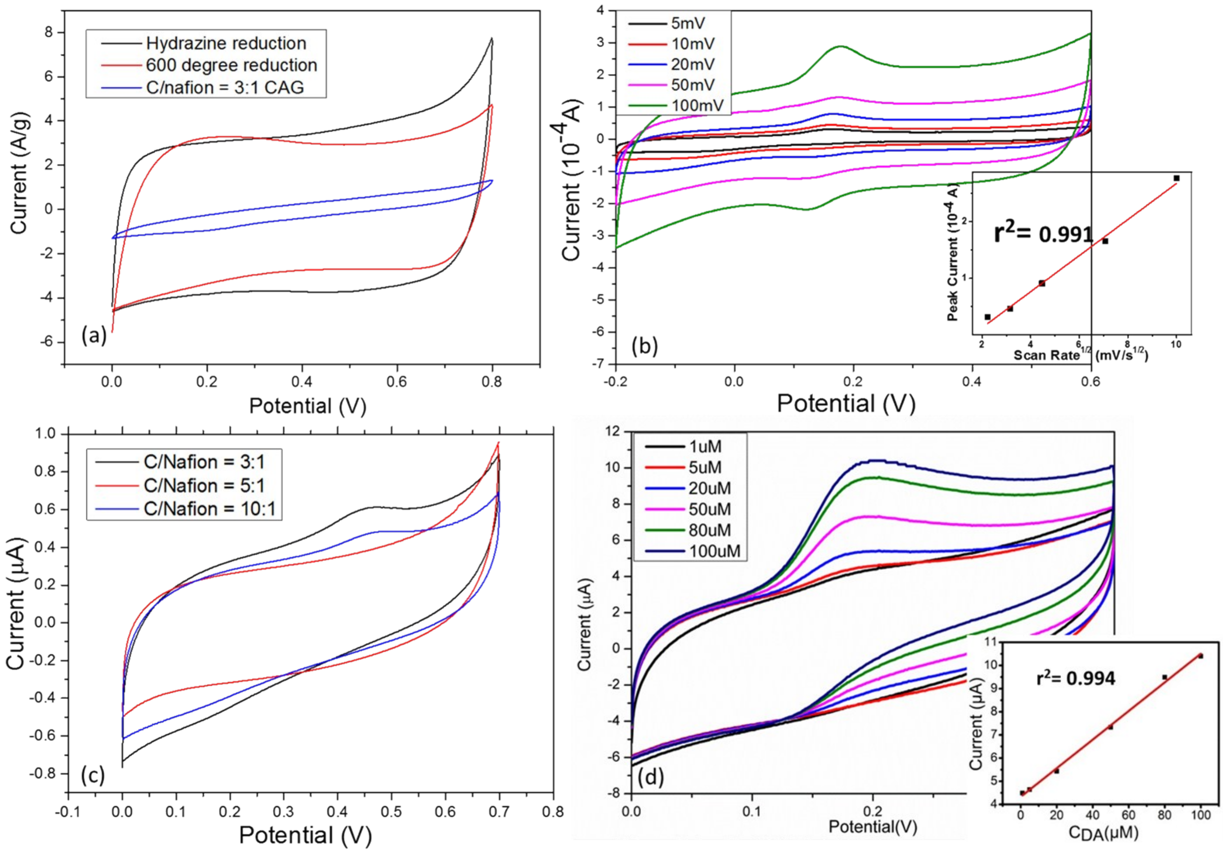
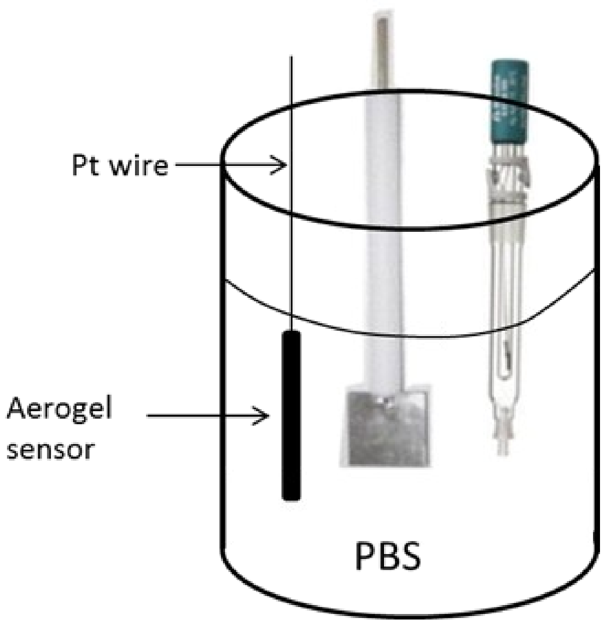


Figure S8. CV of (a) NECAGs under different reduction conditions; (b) hydrazine reduced NECAG under various scan rate in the presence of 10 μM DA; (c) NECAGs with various Nafion loading in the presence of



10μM DA and (d) hydrazine reduced NECAG under various DA concentration. The scan rate is 5mV/s and the DA concentration range is between 1 to 100μM.

Figure S9. Three electrodes system for DA detection.

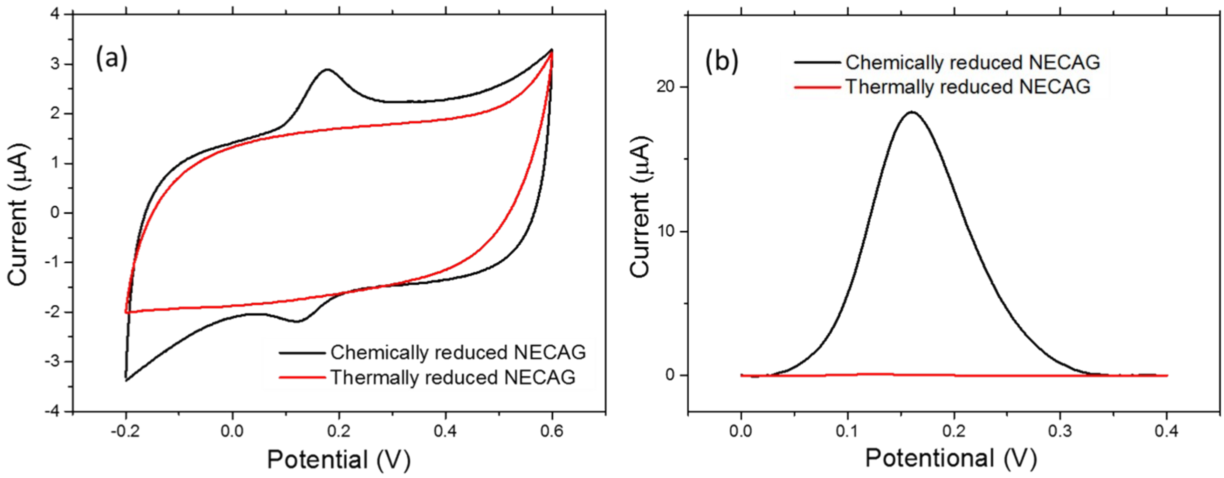


Figure S10. (a) CV of NECAGs under various reduction conditions in the presence of 10μM DA; (b) DPV of NECAGs under various reduction conditions in the presence of 10μM DA. (C/Nafion =3:1, scan rate: 5mV/s.)

Table S1. The specific surface area (SSA) and pore size of NECAG sensor electrodes with various Nafion loadings.

NECAG with various Nafion loadings	**Without Nafion**	**C/Nafion = 3:1**	**C/Nafion = 5:1**	**C/Nafion = 10:1**
SSA (m^2)	121.2	98.7	108.6	117.4
Pore size (μm)	N/A	~90	~35	~15

Table S2. The conductivity and specific capacity of NECAGs reduced under different conditions

NECAGs (GO/MWCNTs=2:1, C/Nafion=3:1)	**Conductivity (S/m)**	**Specific Capacity (F/g) (scan rate: 50 mV/s)**	**Specific Surface Area (m^2)**
No reduction	$3.3 \pm 0.3 \times 10^{-5}$	N/A	98.7
Reduced at 100 °C	$7.4 \pm 0.6 \times 10^{-4}$	14.5	N/A
Reduced at 200 °C	$5.7 \pm 0.2 \times 10^{-2}$	39.9	N/A
Reduced at 600 °C	$1.4 \pm 0.4 \times 10^{2}$	111.3	284.6

Hydrazine reduction	$0.76 \pm 0.08 \times 10^2$	136.8	313.7