Supporting Information

Synthesis and characterization of plasma carbon aerosol coated sponge for recyclable and efficient separation and adsorption

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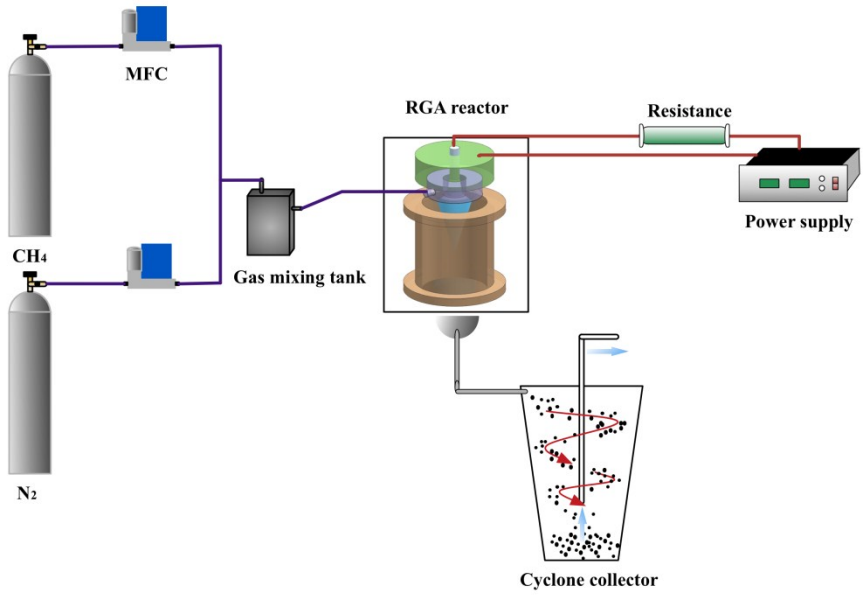

Figure S1. Scheme of rotating gliding arc system for carbon aerosol synthesis

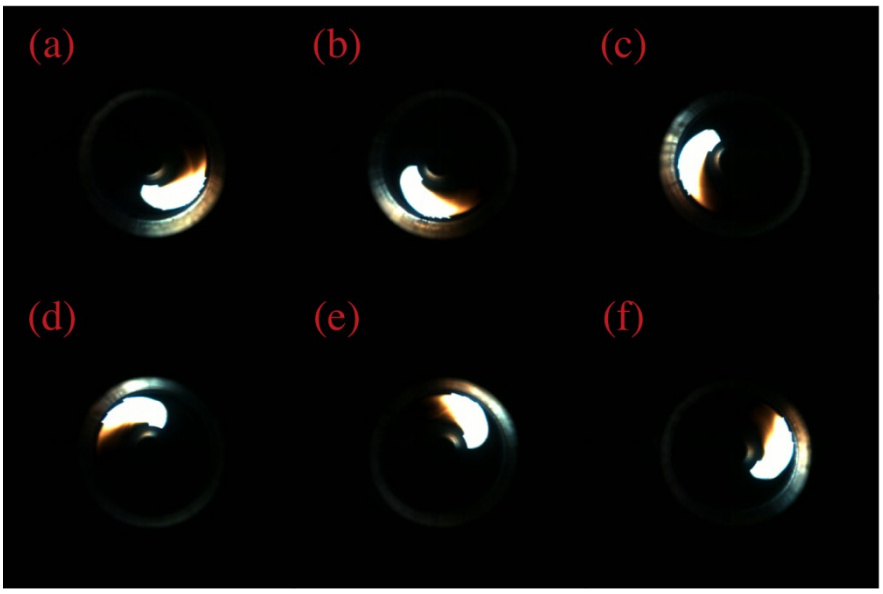

Figure S2. Dynamic behavior of arc motions in CH_4/N_2 discharge (frame rate= 500 frames/s)

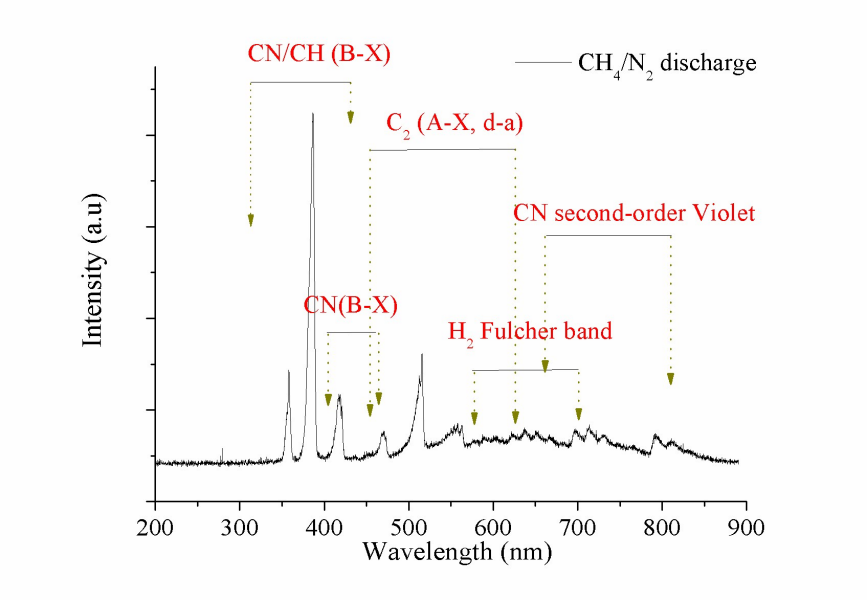

Figure S3. OES spectrum of CH_4/N_2 discharge (CH_4/N_2=0.2, applied voltage=10 kV, gas flow rate=6 L min^{-1})

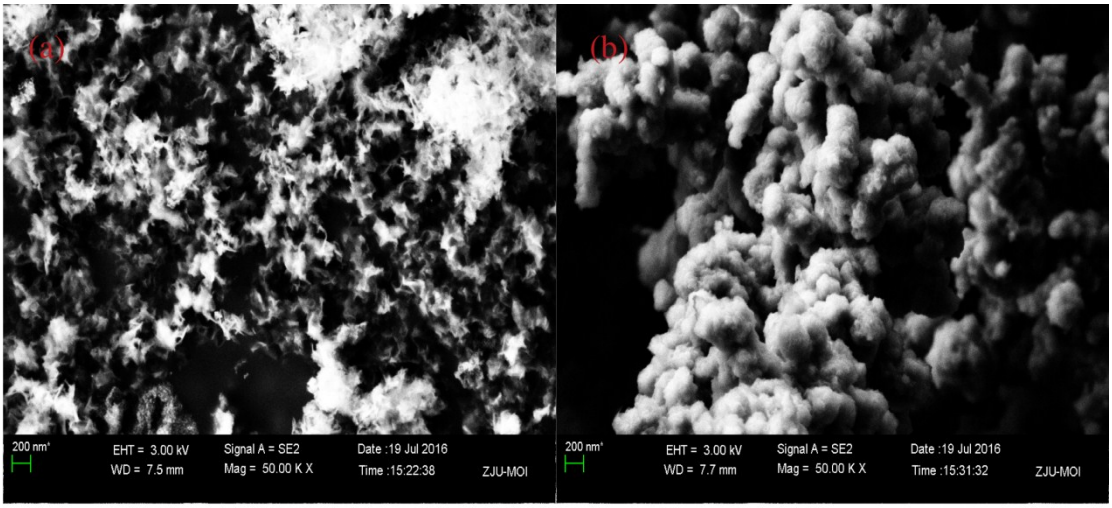

Figure S4. a) SEM images of nanostructure carbon aerosol (CH_4/N_2=0.2). b) SEM images of nanostructure carbon aerosol (CH_4/N_2=0.8)

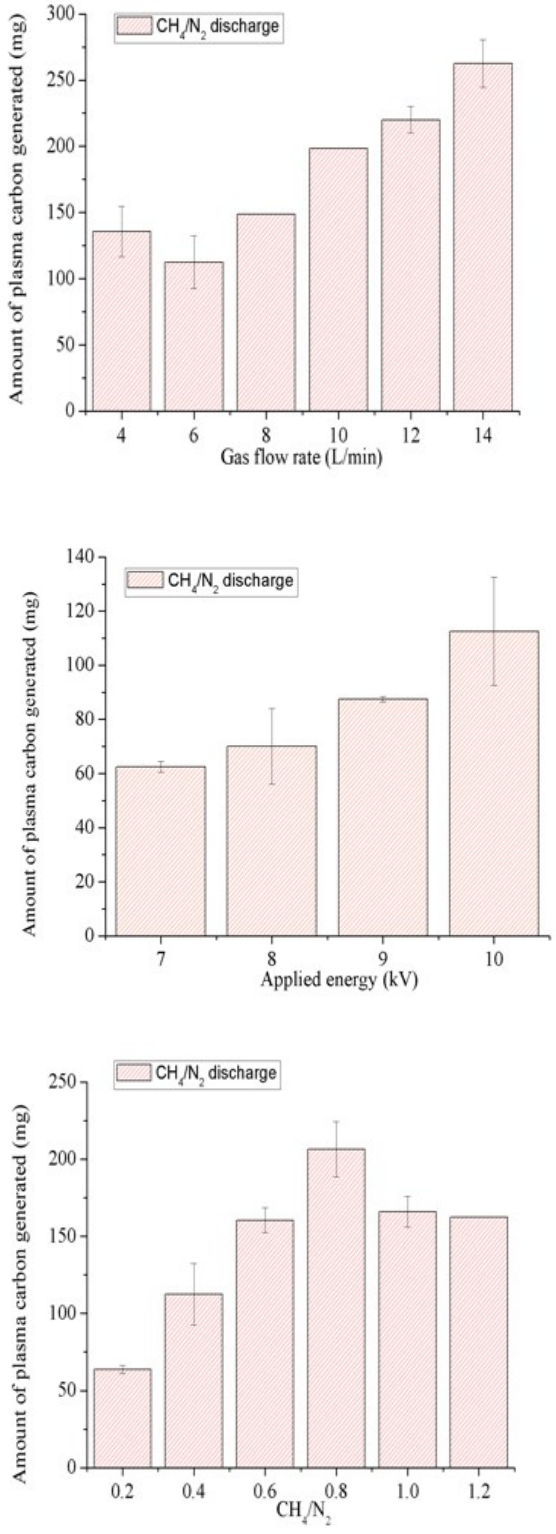

Figure S5. The influences of operating parameters (gas flow rate, applied voltage and CH_4/N_2 ratio) on the growth rate of carbon aerosol

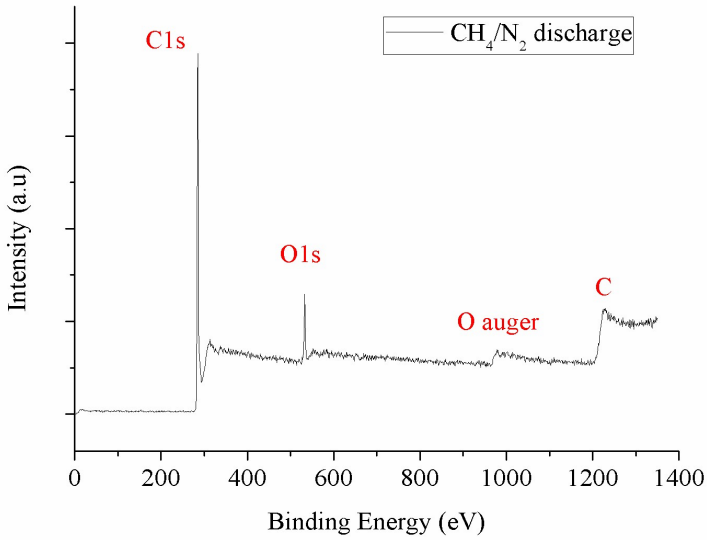

Figure S6. Full scanning XPS spectra of plasma-generated carbon aerosol

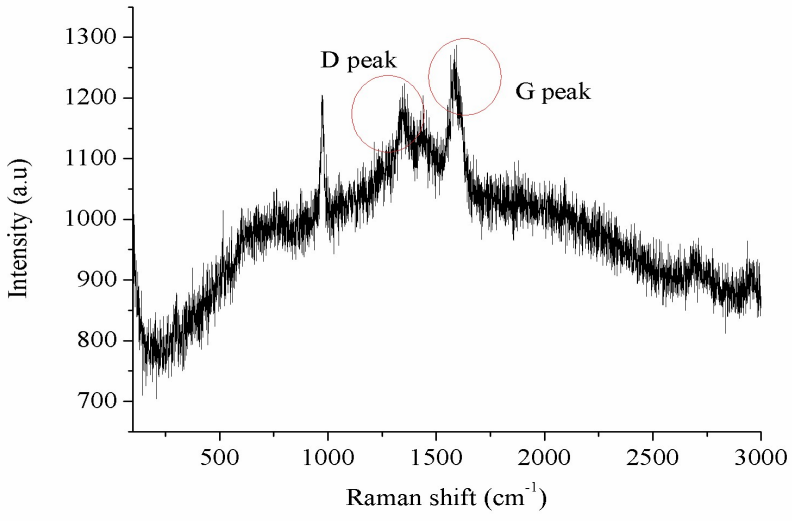

Figure S7. Raman spectrum of carbon aerosol coated sponge

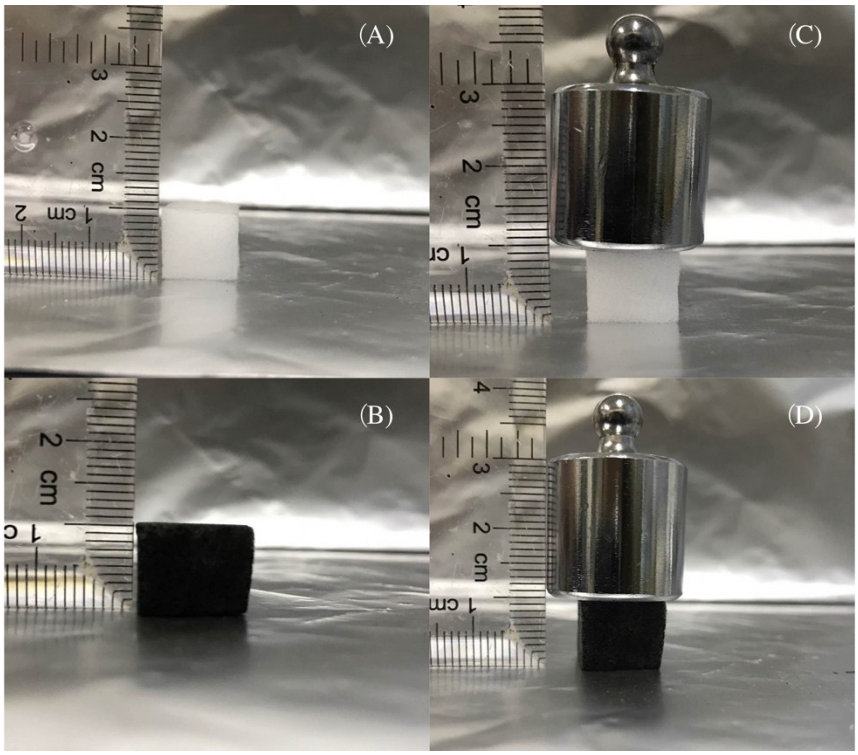

Figure S8. Digital photograph of same weight on the pristine sponge and carbon aerosol coated sponge.

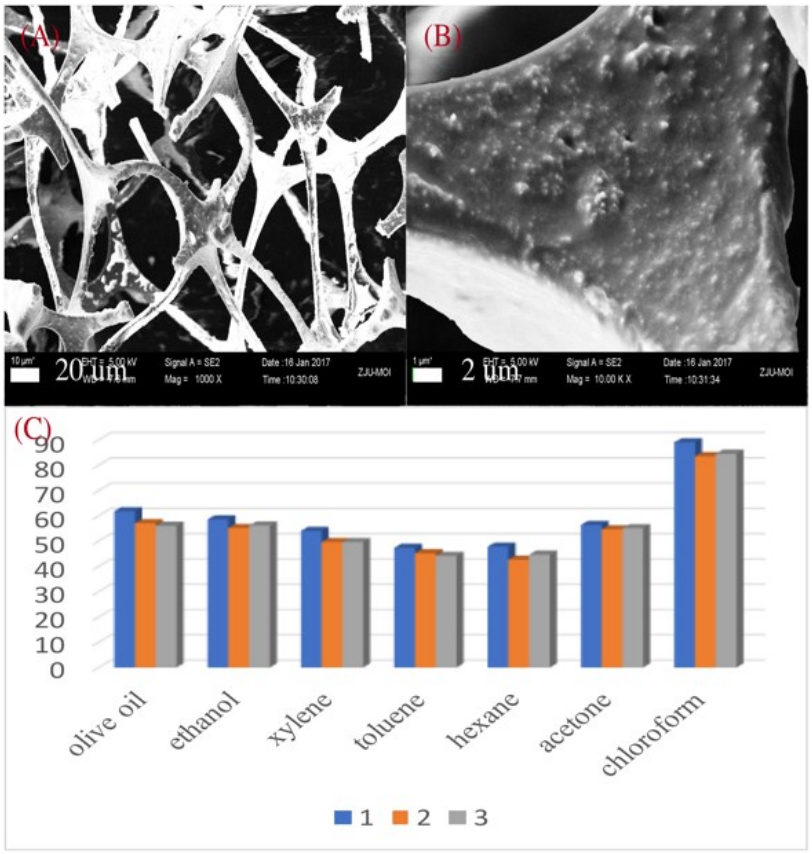

Figure S9. A) SEM image of commercial melamine sponge with carbon aerosol and PDMS (scale bar: 20 um); The enlarge SEM image of carbon aerosol

embedded in PDMS matrix (scale bar: 2 um); Adsorption tests of sponge decorated with both carbon aerosol and PDMS.

Table S1. Comparison of various adsorption materials

Adsorption materials	Adsorbates	Absorption capacity (g g^{-1})	recyclability	Ref.
Carbon soot sponge	oil	~80	~94% capacity remaining (10 cycles)	1
Carbon aerogel	Oil/organic solvents	16-50	>95% capacity remaining (6 cycles)	2
Graphene sponge	oil	165	20% capacity remaining (5 cycles	11
Spongy graphene	oil	20-86	>99% capacity remaining (6 cycles)	12
CNT/Carbon foam	oil	28	/	26
CNT sponge	oil	100	20-40% capacity remaining (10 cycles)	27
Expanded graphite	oil	83	/	28
Graphene aerogel	Oil/organic solvents	30-40	/	29
Carbon fiber aerogel	organic solvents	50-192	/	30
Reduced graphite Oxide foam	Organic solvents	26-37	>99% capacity remaining (10 cycles)	31
Plasma carbon aerosol sponge	Oil/organic solvents	61 (for oil) 86 (for chloroform)	>90% capacity remaining (5 cycles)	Present work

Reference:

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