

## Egg-shell Derived Carbon Dots for Base Pair Selective DNA Binding and Recognition

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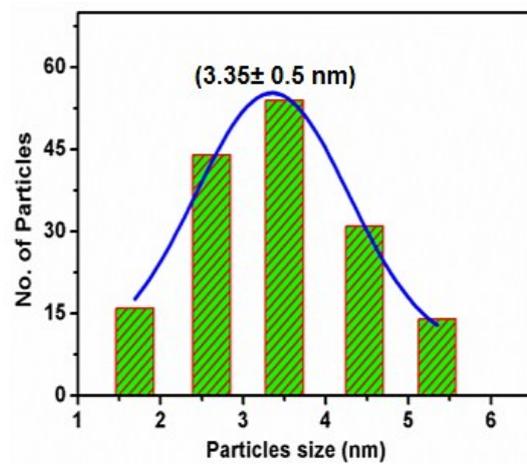
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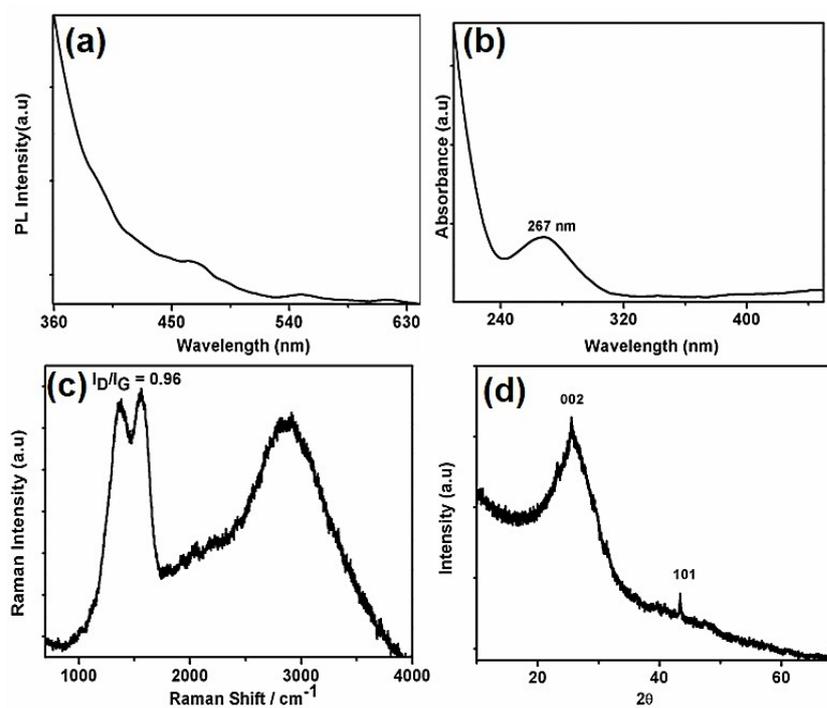
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**Table S1:** Summary of Molar Absorption Coefficients of Different Nucleic Acids.

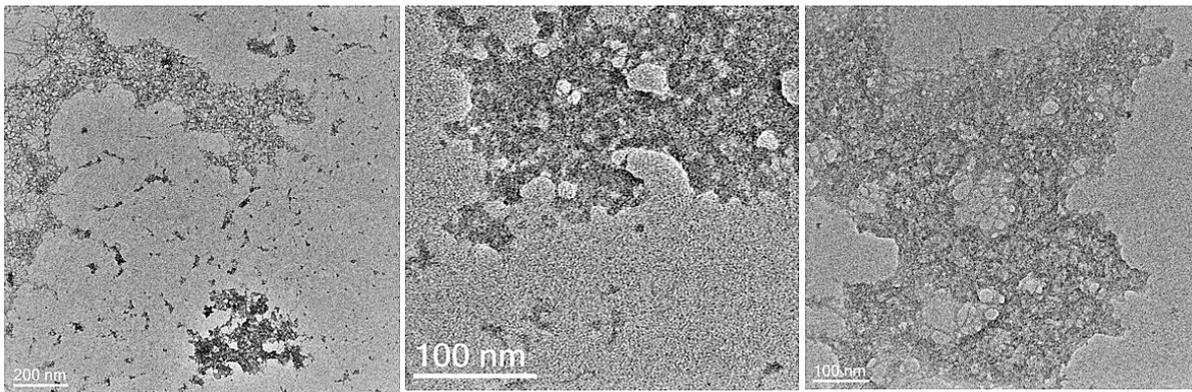
DNA sample	Base Pair Contents		Molar Absorption Coefficient ( $\epsilon$ ) $\text{M}^{-1} \text{cm}^{-1}$
	A-T (mol%)	G-C (mol%)	
CT	58	42	13200
EC	50	50	13000
ML	28	72	13,800
poly(dA).poly(dT)	100	0	12,200
poly(dG).poly(dC)	0	100	16,800
poly(dA-dT).poly(dA-dT)	100	0	13,200



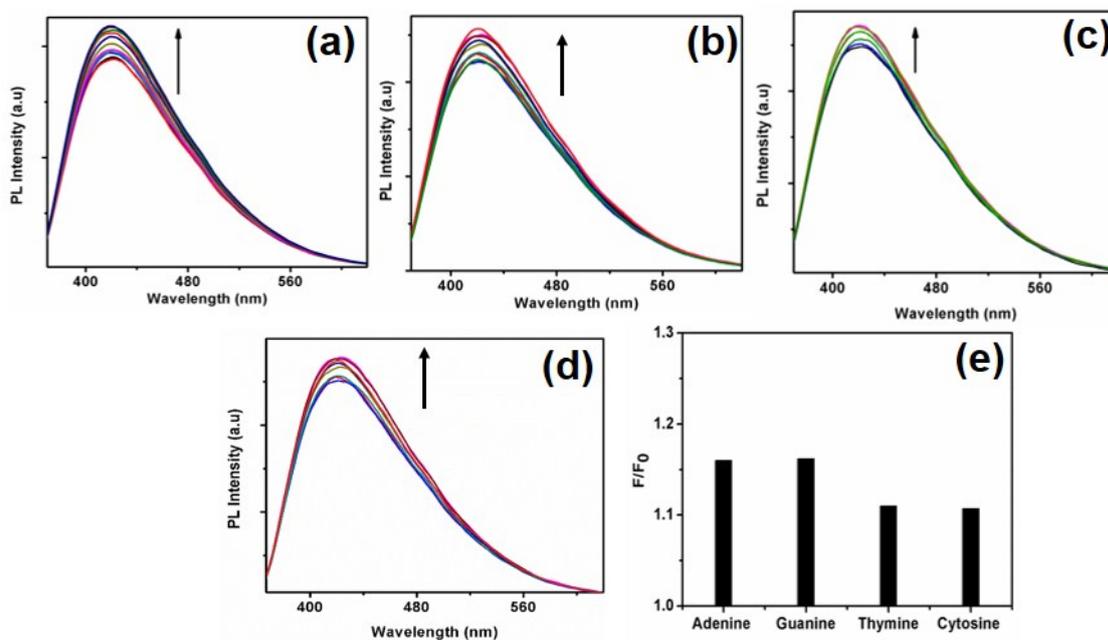
**Fig. S1:** Average particle size distribution obtained from the TEM images.



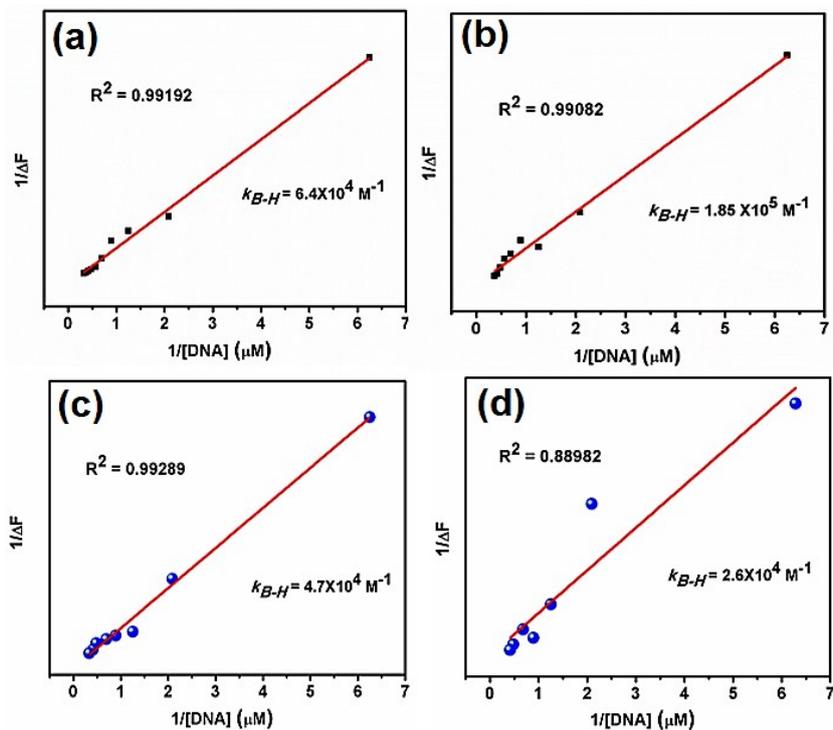
**Fig. S2:** (a) Emission spectrum of C400 at 350 nm excitation, (b) absorbance spectrum (c) the Raman spectrum and (d) XRD of C400.



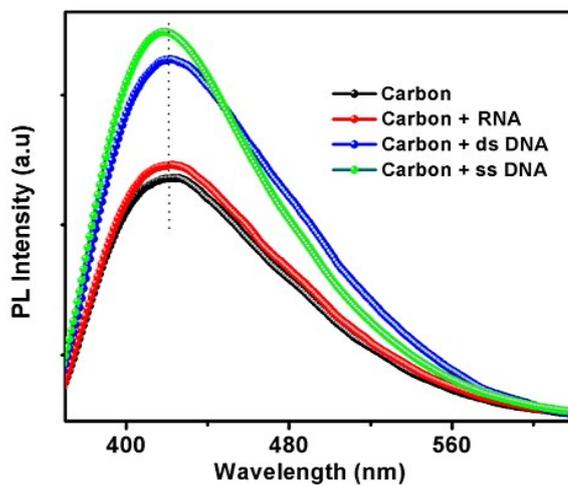
**Fig. S3.** TEM images of carbon prepared 400 °C.



**Fig. S4.** (a), (b), (c) and (d) represent fluorescence titration of CD with increasing concentration of different nucleobases (0- 6.2  $\mu\text{M}$ ) at 350 nm excitation.



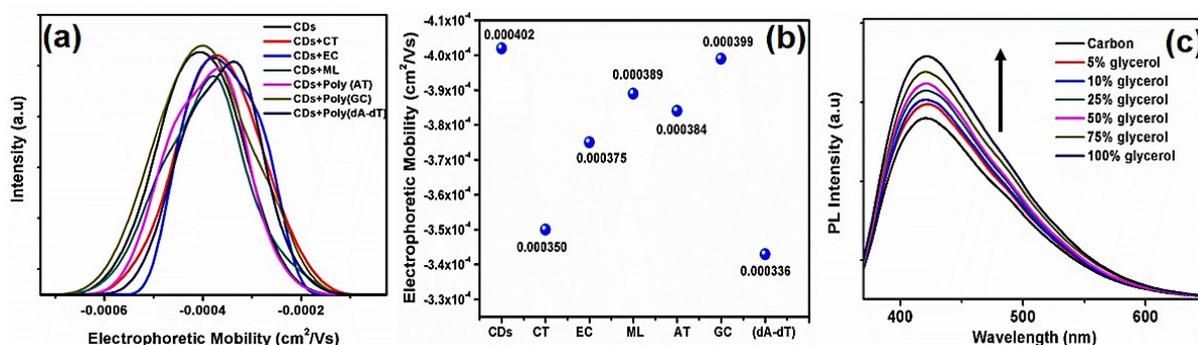
**Fig. S5.** (a), (b) (c) and (d) represent the binding constant of CD to adenine, guanine, thymine and cytosine, respectively.



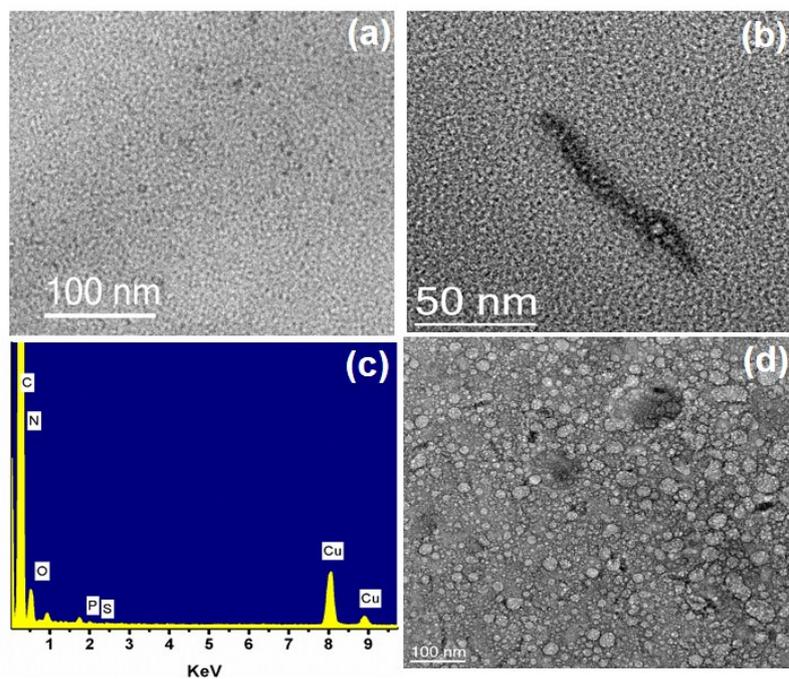
**Fig. S6.** Fluorescence spectra of CD in the presence of different concentration of ds DNA, ss CT DNA and tRNA.

**Table S2.** Melting Temperature Changes ( $\Delta T_m$ ) of different DNAs and CDs system.

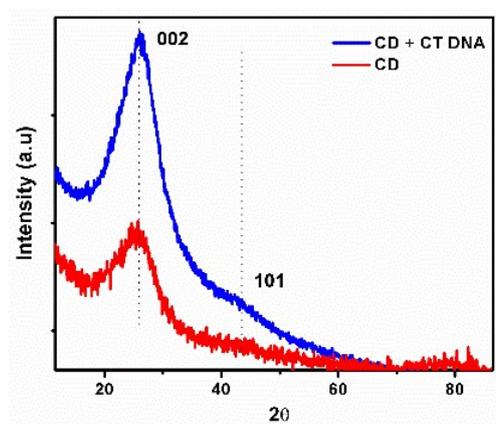
DNA	% AT content	$T_m$ ( $^{\circ}\text{C}$ )	DNA + CD	$T_m$ ( $^{\circ}\text{C}$ )	$\Delta T_m$ ( $^{\circ}\text{C}$ )
CT DNA	58	65.26	CT DNA + CD	70.16	4.9
EC DNA	50	69.83	EC DNA + CD	72.13	2.3
ML DNA	28	88.17	ML DNA + CD	90.2	1.9
Poly(dA).Poly(dT)	100	45.24	Poly(dA).Poly(dT) + CD	53.44	8.2
Poly(dG).Poly(dC)	0	78.57	Poly(dG).Poly(dC) + CD	80.25	1.68
Poly(dA-dT).Poly(dA-dT)	100	39.43	Poly(dA-dT).Poly(dA-dT) + CD	49.52	10.09



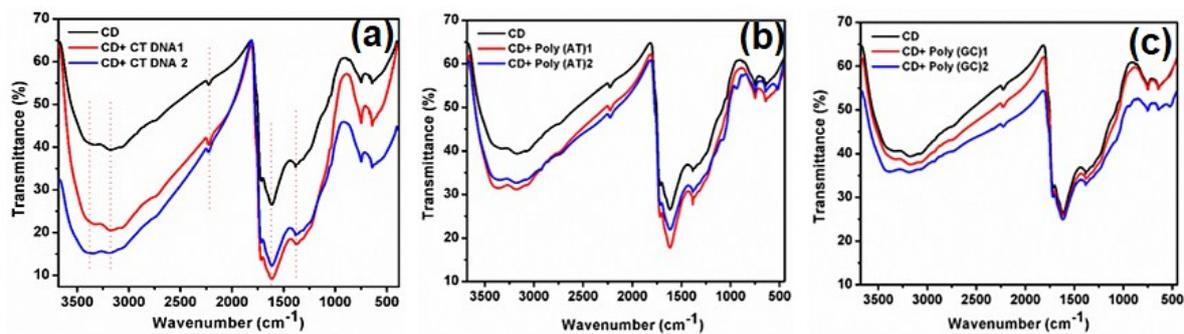
**Fig. S7.** (a) and (b) Electrophoretic mobility of CD and CD in the presence of different kinds of double stranded DNA, (c) is the fluorescence spectra of CD with increasing % glycerol.



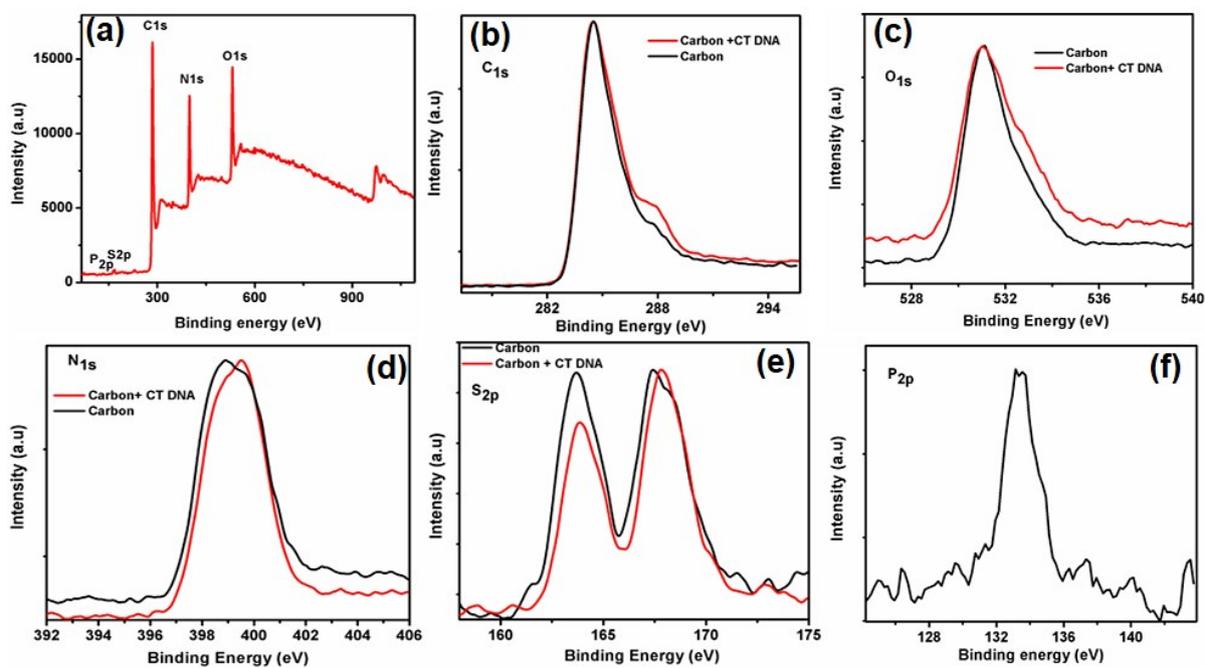
**Fig. S8.** (a), (b) and (d) are the bright field TEM images of CD and CT DNA complex and (c) is the EDAX data.



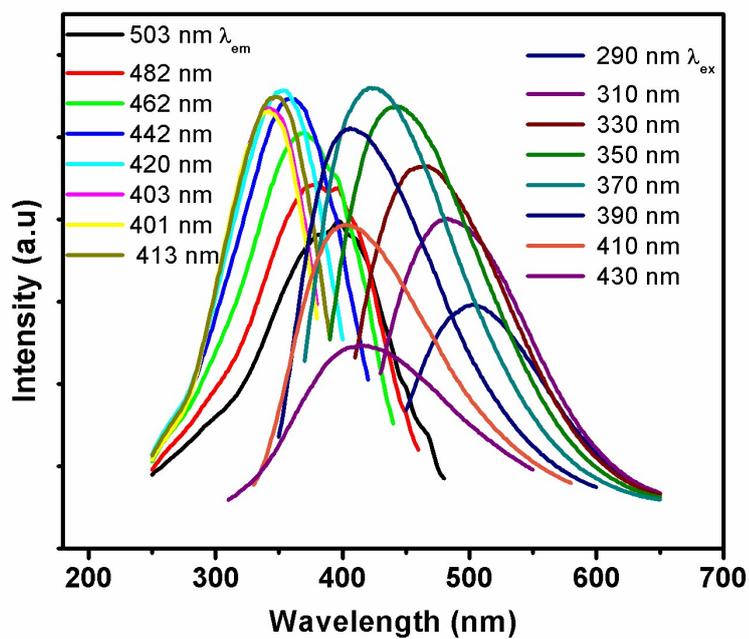
**Fig. S9.** XRD pattern of the ESM derived carbon dots (CD) with and without CT DNA.



**Fig. S10.** FTIR spectra of CD in the presence of (a) CT DNA, (b) poly(dA).poly(dT) and (c) poly(dG).poly(dC).



**Fig. S11.** (a) Survey XPS of CD and CT DNA system, (b)-(f) represents high resolution XPS spectrum of C<sub>1s</sub>, O<sub>1s</sub>, N<sub>1s</sub>, S<sub>2p</sub> and P<sub>2p</sub>, respectively and comparison with XPS of bare CD..



**Fig. S12:** Excitation dependent emission spectra and emission dependent emission dependent excitation spectra of CD and CT DNA system.