

Additional file

Rational Synthesis, Characterization, and Application of Environmentally-Friendly (Polymer-Carbon Dot) Hybrid composite film for fast and Efficient UV assisted Cd²⁺ Removal from Water

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Additional file Table S1.

Table S1. The world production of petrol coke

(Source: Dynamics 2004)

Region	Participation (%)
America	78.6
Europe	8.5
Asia	6.9
Ex-URSS	5.0
Africa	0.5

Oceania	0.5
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[Additional file Table S2.](#)

Table S2. Recent coal prices of petrol coke in Gulf region and Venezuela as function of sulfur content and HGI

Origin	Sulfur (%)	Price (US dollars per ton)
Gulf region and Venezuela	4-5	62.00
	6	50.00
	6	51.00

[Additional file Table S3.](#)

Table S3. Petrol coal composition (Adapted of Furimsky (2000), salavador et al (2003) and Garcia (2002))

Composition (% in mass)	Petroleum coke (Fluidized bed production process)
C	86.3
H	2.2
N	0.32
S	6.9
O	0.9

[Additional file Figure S1.](#)

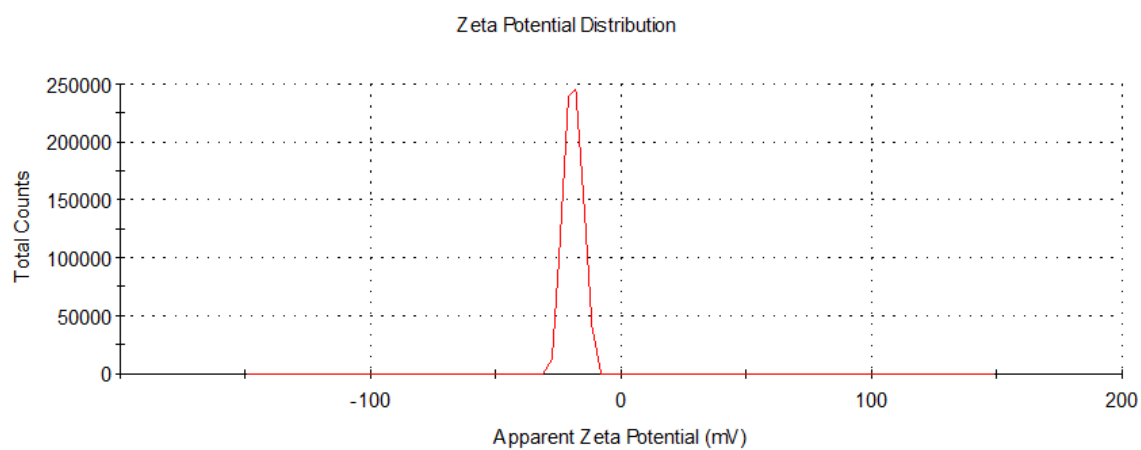


Figure S1. Zeta potential of CDs

[Additional file Figure S2.](#)

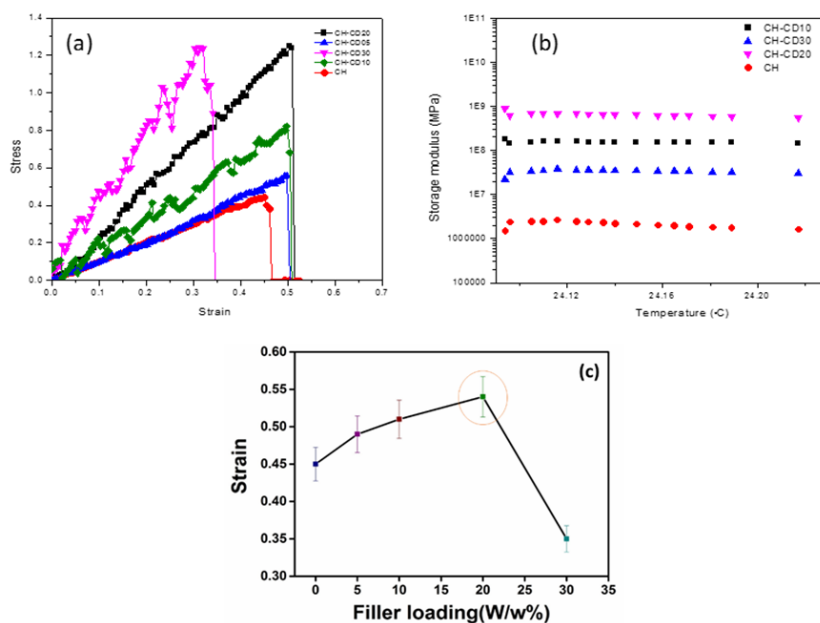


Figure S2. (a) Stress strain curve of pure and modified chitosan CDs nanocomposite films. (b) Temperature dependence storage modulus of the pure chitosan and loaded with 5, 10, 20 and 30wt. % of CDs loadings (c) strain dependence filler loading , showing the percolation limit.

[Additional file Figure S3.](#)

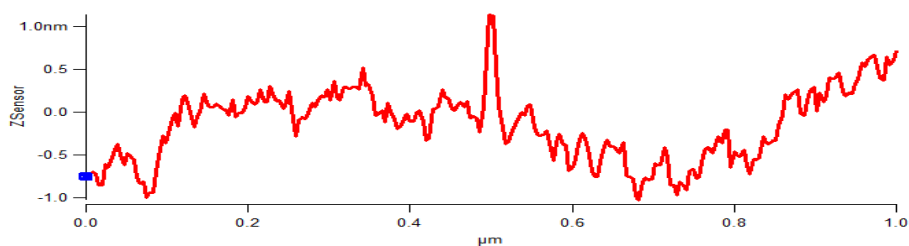


Figure S3. The height profile corresponding to the AFM image of CDs.

[Additional file Table S4.](#)

Table S4. XPS-determined apparent surface composition of PC, CDs, and CH-CDs materials.

Materials	C	N	O	S	Al	Na	K	Mg
PC	6.82	0.05	63.4	19.1	8.10	0.71	0.61	1.23
CDs	80.9	9.90	9.07	0.17	-	-	-	-
CH-CDs	14.2	1.37	54.4	20.7	7.20	0.13	0.44	1.52

[Additional file Figure S4.](#)

Wavelength	350	520	600
Color change			

Figure S4. Color changes of the prepared CDs material as function of wavelength

[Additional file Figure S5.](#)

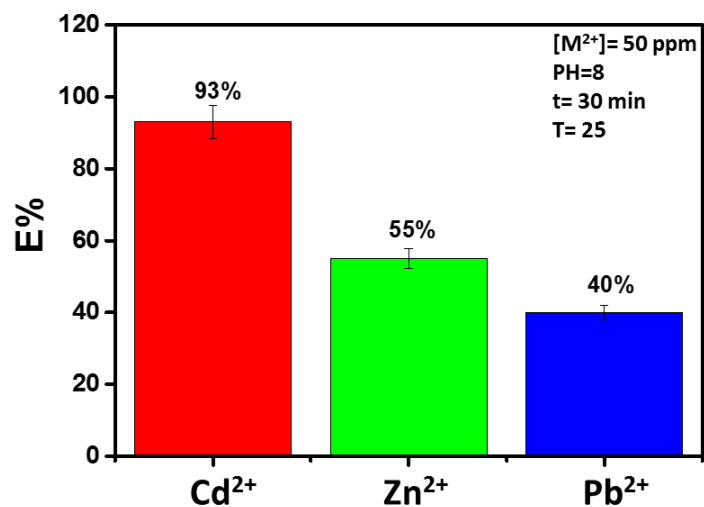


Figure S5. Trends of the extraction efficiency percentages based on ICP analysis, showing the selectivity tests using in presence of Cd (II), Zn (II) and Pb (II) under UV light.

[Additional file Figure S6.](#)

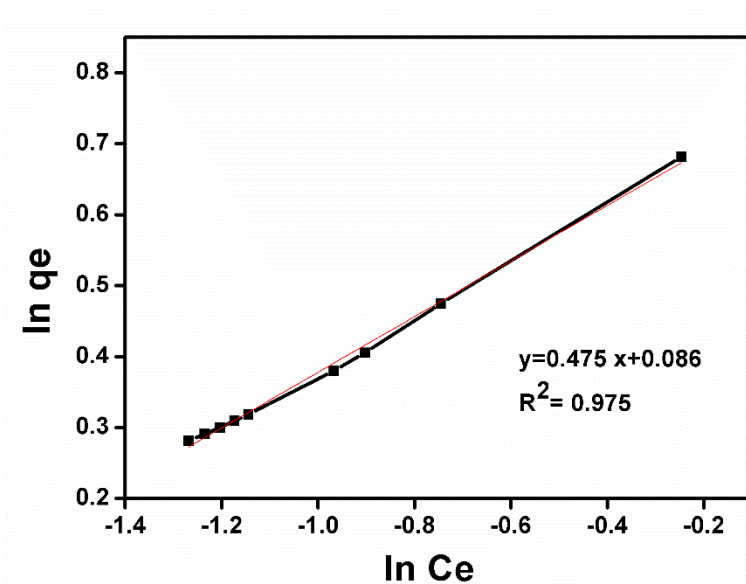


Figure S6. Freundlich model for adsorption of Cd (II) onto CH-CDs