

1 *Supplementary Information*

2 **Amphoteric Starch Derivatives as Reusable Flocculant for Heavy-Metal**
3 **Removal**

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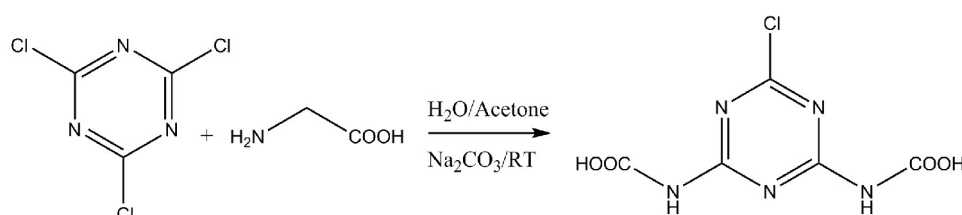
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13 **Text S1.** The synthesis route of 2-chloro-4,6-diglycino-1,3,5-triazine (CDT)

14 Cyanuric chloride (3.68 g, 20 mmol) in acetone (40 mL) was added dropwise to
15 an ice-cold mixture of Na₂CO₃ (8.48 g, 80 mmol) and glycine (3.00 g, 40 mmol) in
16 deionized water (60 mL) more than 30 min. The reaction mixture was stirred
17 overnight at room temperature (RT). The reaction mixture was neutralized with
18 concentrated HCl and filtered off. Then, the mixture washed three times with cold
19 and deionized water and dried to get target product CDT(Khattab et al., 2016).



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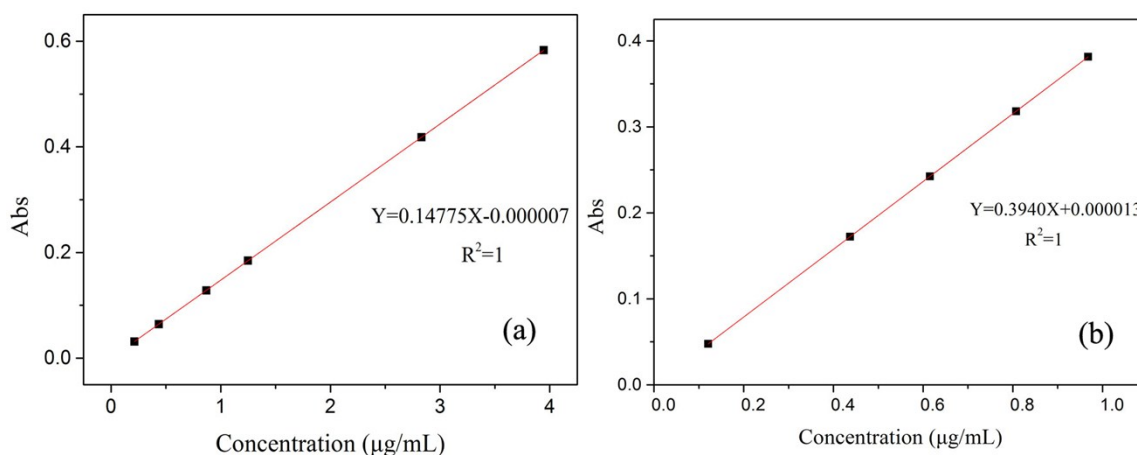
Scheme 1S. The synthesis route of CDT.

22 **Text S2.** Preparation of PRAS ($DS = 0.23$)

23 PRAS ($DS = 0.23$) was prepared via an etherifying reaction between CDT and
24 starch(ST) in dimethyl sulfoxide (DMSO). Typically, ST (0.028 mol, 4.9 g), solid sodium
25 hydroxide (0.253 mol, 10.7 g), CDT (0.115 mol, 30.2 g), and DMSO were mixed in a
26 four-necked flask under a N_2 stream. The mixture was then heated to $80\text{ }^\circ\text{C}$ and
27 maintained at that temperature for 20 min. Thereafter, the mixture was stirred at
28 $130\text{ }^\circ\text{C}$ for 10 h and then cooled to room temperature. Afterwards, three times the
29 solution volume of methanol were added to the content of the flask, and the
30 resulting precipitate was separated by filtration and then dried in a drying oven at
31 $105\text{ }^\circ\text{C}$ for 10 h. The product was purified by dialysis molecular weight cut-off
32 (MWCO) 7000 Da against distilled water for 96 h, followed by lyophilization.

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34 **Text S3. Standard curve**



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Fig. S1. Standard curve of Zinc (a) and Copper (b).

37 **References**

38 Khattab, S. N., Abdel Naim, S. E., El-Sayed, M., El Bardan, A. A., Elzoghby, A. O., Bekhit, A. A.,
39 & El-Faham, A. (2016). Design and synthesis of new s-triazine polymers and their application
40 as nanoparticulate drug delivery systems. *New Journal of Chemistry*, 40(11), 9565-9578.

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