

Poly (Amidehydrazide) Hydrogel Particles for Removal of Cu^{2+} and Cd^{2+} Ions from Water

Hojung Choi, Taehyoung Kim and Sang Youl Kim *

Supplementary Materials:

1. Optical Microscope (OM) images of ADH-PAMH_x, SDH-PAMH_x and MDH-PAMH_x

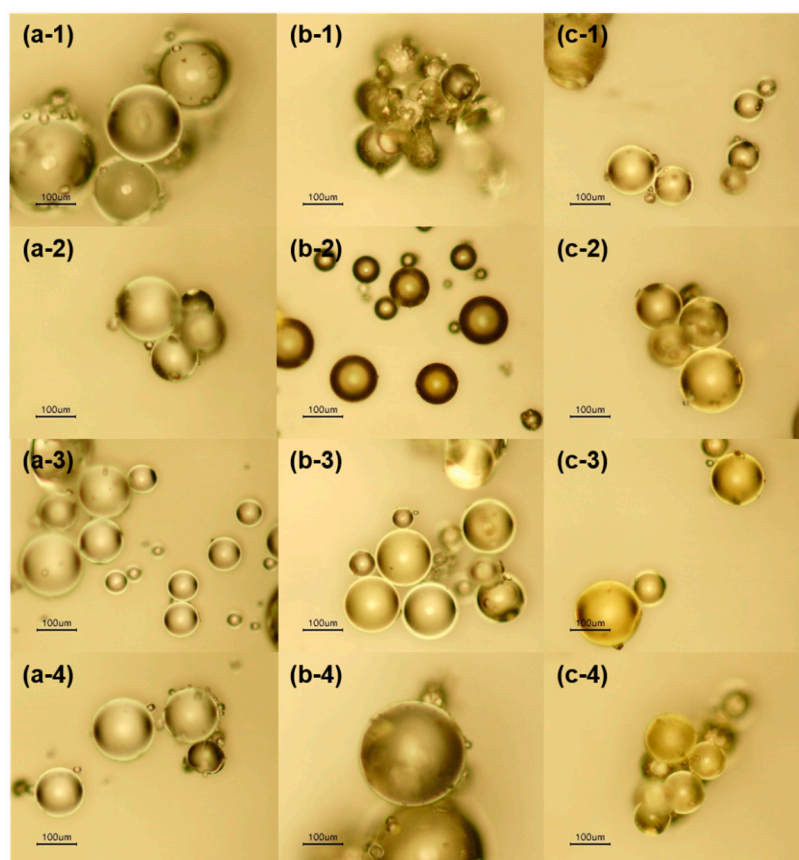


Figure S1. OM images of ADH-PAMH_x (a), SDH-PAMH_x (b), MDH-PAMH_x (c) for different x of 1.25 (1), 1.5 (2), 1.75 (3), 2 (4). For example, (b-2) is an image of SDH-PAMH_{1.5}.

2. ATR-IR spectra of SDH-PAMH_x and MDH-PAMH_x

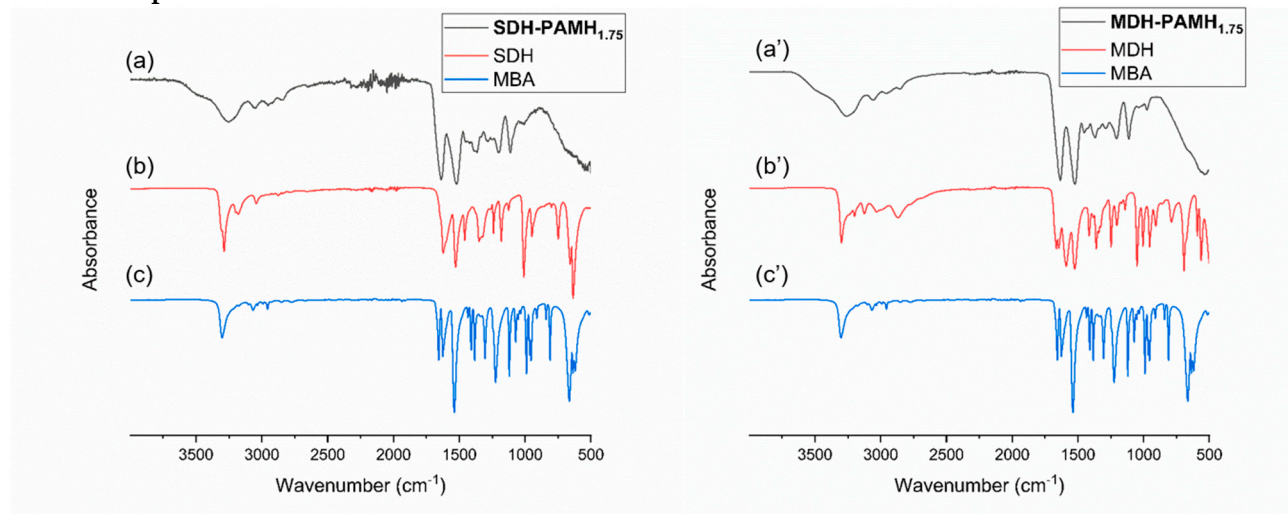


Figure S2. ATR-IR spectra of SDH-PAMH_{1.75} (a), SDH (b), MBA (c), MDH-PAMH_{1.75} (a'), MDH (b'), MBA (c'). .

3. Scanning Electron Microscopy (SEM) images and EDX analysis of ADH-PAMH_{1.75}, SDH-PAMH_{1.75} and MDH-PAMH_{1.75}

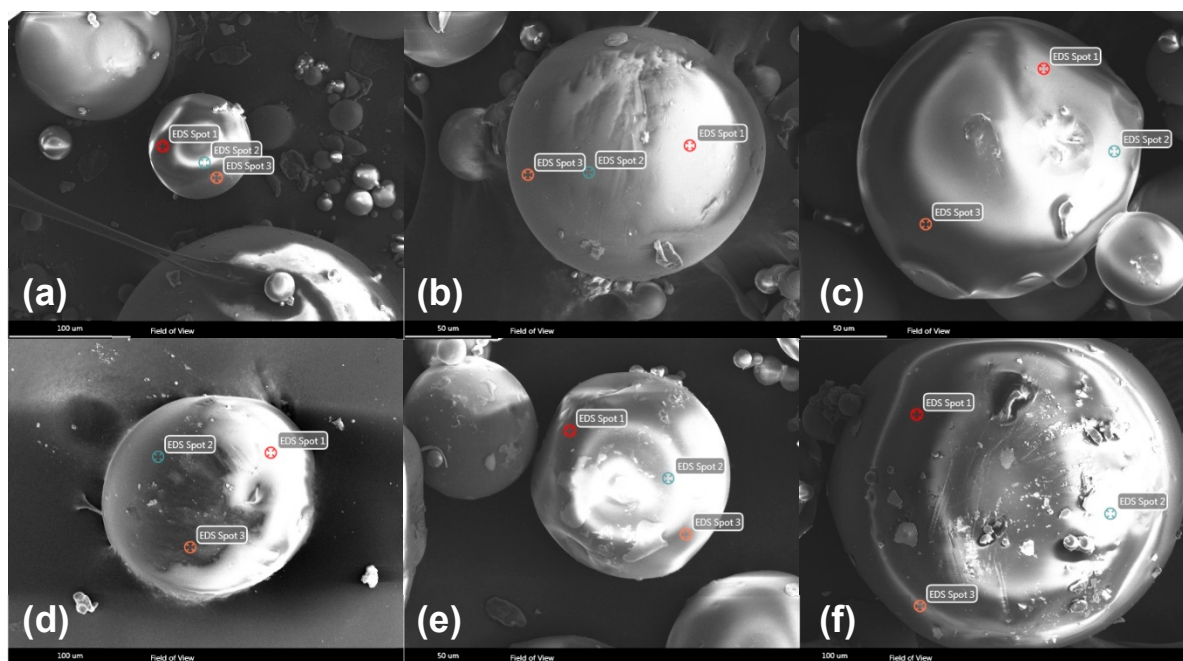
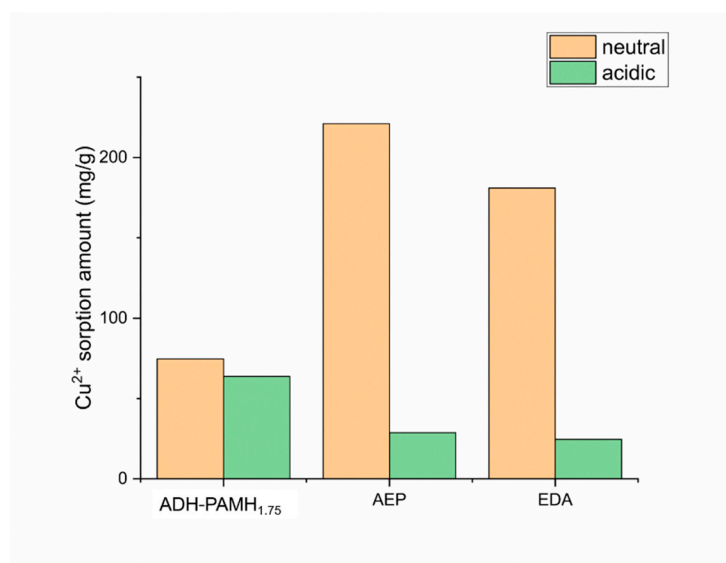


Figure S3. SEM images of ADH-PAMH_{1.75} (a,d), SDH-PAMH_{1.75} (b,e), MDH-PAMH_{1.75} (c,f) for Cu²⁺ sorption (a,b,c) and Cd²⁺ sorption (d,e,f).

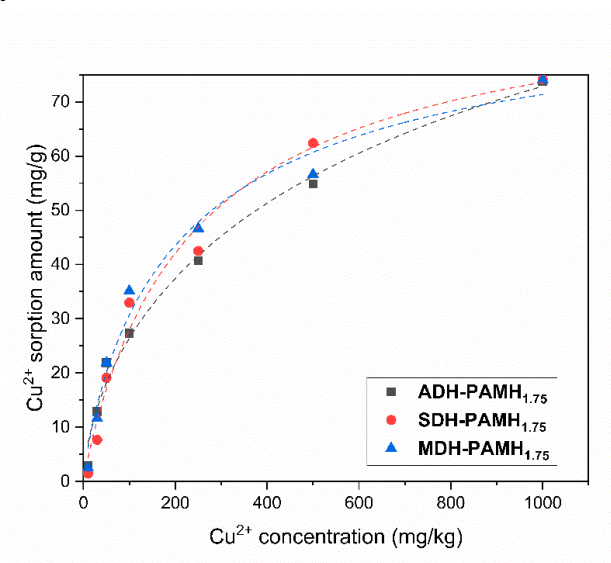
Table S1. EDX data of ADH-PAMH_{1.75}, SDH-PAMH_{1.75}, and MDH-PAMH_{1.75}. all values of table are weight percent (%).

Element	ADH-PAMH _{1.75}		SDH-PAMH _{1.75}		MDH-PAMH _{1.75}	
	Cu ²⁺	Cd ²⁺	Cu ²⁺	Cd ²⁺	Cu ²⁺	Cd ²⁺
C K	45.43	55.94	38.97	47.43	39.52	47.34
N K	19.70	22.21	18.63	23.02	26.94	18.24
O K	14.89	16.08	14.64	14.48	17.68	23.95
Cu L	10.38	-	13.43	-	10.70	-
Cd L	-	3.84	-	10.34	-	7.67
Cl K	9.59	1.93	14.32	4.73	5.15	2.81

4. Cu²⁺ sorption test in acidic condition

**Figure S4.** Cu²⁺ sorption test in acidic condition (pH 4) and neutral condition. AEP is PAMAM gel consist of aminoethylpiperazine and MBA, EDA is PAMAM gel consist of ethylenediamine and MBA.

5. Cu²⁺ sorption isotherm of dihydrazide-PAMH_x

**Figure S5.** Cu²⁺ Sorption isotherm of ADH-PAMH_{1.75}, SDH-PAMH_{1.75}, and MDH-PAMH_{1.75}.

6. FT-IR spectroscopy for metal-complexd ADH-PAMH_{1.75}

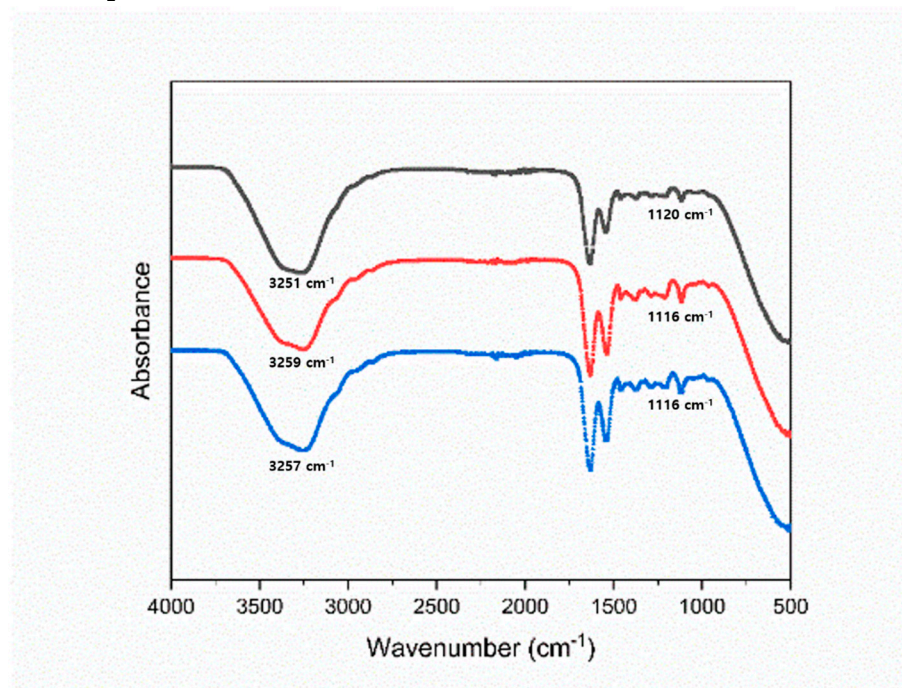


Figure S6. ATR-IR for metal absorbed ADH-PAMH_{1.75} (black: wet ADH-PAMH_{1.75}, red: Cu²⁺ absorbed ADH-PAMH_{1.75}, blue: Cd²⁺ absorbed ADH-PAMH_{1.75})