Supporting information

Transformation details of poly(acrylonitrile) to poly(amidoxime) during amidoximation process

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Table SI-1. Curve fitting results of XPS N 1s spectra.

	Peak	BE[a] (eV)	FWHM[b] (eV)	at. %
PAN	–C≡N	398.72	1.52	74.3
	N–H	399.30	2.42	25.7
PAO, 1 h	–C≡N	398.80	1.70	32.0
	N–H	399.30	1.30	60.8
	$-C(NH_2)=NOH$	400.40	1.32	7.20
PAO, 2 h	–C≡N	398.78	2.12	26.7
	N–H	399.33	1.26	62.7
	$-C(NH_2)=NOH$	400.40	1.83	10.5
PAO, 3 h	–C≡N	398.75	1.79	28.0
	N–H	399.30	1.26	58.0
	$-C(NH_2)=NOH$	400.54	1.54	14.0
PAO, 4 h	–C≡N	398.80	1.94	24.6
	N–H	399.30	1.28	59.9
	$-C(NH_2)=NOH$	400.40	1.66	15.6
PAO, 6 h	–C≡N	398.60	1.86	20.2
	N–H	399.30	1.28	65.8
	$-C(NH_2)=NOH$	400.40	1.80	14.0
PAO, 12 h	–C≡N	398.60	1.81	20.0
	N–H	399.37	1.23	65.6
	$-C(NH_2)=NOH$	400.41	1.49	14.4
PAO, 24 h	–C≡N	398.80	1.83	19.3
	N–H	399.30	1.27	70.0
	$-C(NH_2)=NOH$	400.45	1.82	10.8

[a]: Binding energy, [b]: Full width at half–maximum.

Table SI-2. Curve fitting results of XPS C 1s spectra.

	Peak	BE (eV)	FWHM (eV)	at. %
PAN	–C≡N	284.66	1.49	66.2
	C–C	285.20	1.43	13.2
	C–OH	286.42	1.28	13.5
	C=O	287.47	1.69	6.39
	$–COO^-$	288.70	1.10	0.77
PAO, 1 h	–C≡N	284.66	1.54	59.7
	C–C	285.22	1.41	11.2
	C–OH, $-C(NH_2)=NOH$	286.42	1.15	21.2
	C=O	287.50	1.83	6.61
	$–COO^-$	288.70	1.18	1.40
PAO, 2 h	–C≡N	284.62	1.39	57.5
	C–C	285.39	1.57	13.2
	C–OH, $-C(NH_2)=NOH$	286.34	1.08	16.1
	C=O	287.50	2.00	10.9
	$–COO^-$	288.70	0.97	2.39
PAO, 3 h	–C≡N	284.60	1.38	64.3
	C–C	285.40	1.55	10.7
	C–OH, $-C(NH_2)=NOH$	286.30	1.15	12.3
	C=O	287.50	2.07	10.4
	$–COO^-$	288.70	1.09	2.18
PAO, 4 h	–C≡N	284.61	1.19	52.2
	C–C	285.20	2.34	29.8
	C–OH, $-C(NH_2)=NOH$	286.35	0.98	7.69
	C=O	287.50	1.98	6.35
	$–COO^-$	288.60	0.89	3.96
PAO, 6 h	–C≡N	284.60	1.26	55.2
	C–C	285.20	2.57	26.7
	C–OH, $-C(NH_2)=NOH$	286.30	1.10	9.78
	C=O	287.50	1.80	6.71
	$–COO^-$	288.60	0.93	1.54
PAO, 12 h	–C≡N	284.60	1.27	57.3
	C–C	285.20	2.56	24.0
	C–OH, $-C(NH_2)=NOH$	286.30	1.01	7.58
	C=O	287.50	1.26	2.22
	$–COO^-$	288.60	1.07	8.95
PAO, 24 h	–C≡N	284.64	1.24	54.2
	C–C	285.20	2.41	26.9
	C–OH, $-C(NH_2)=NOH$	286.35	1.05	9.59
	C=O	287.30	1.72	7.01
	$–COO^-$	288.50	1.19	2.23

Table SI-3. Curve fitting results of XPS O 1s spectra.

	Peak	Position (eV)	FWHM (eV)	at. %
PAN	$–COO^-$	531.20	1.93	36.8
	C=O	532.40	1.54	45.0
	–OH	533.40	1.82	18.1
PAO, 1 h	$–COO^-$	531.26	2.03	43.6
	C=O, $–C(NH_2)=NOH$	532.30	1.61	49.4
	–OH	533.40	1.55	7.00
PAO, 2 h	$–COO^-$	531.30	1.95	44.3
	C=O, $–C(NH_2)=NOH$	532.30	1.93	49.5
	–OH	533.40	1.09	6.21
PAO, 3 h	$–COO^-$	531.22	2.06	44.1
	C=O, $–C(NH_2)=NOH$	532.31	1.78	47.7
	–OH	533.40	1.28	8.17
PAO, 4 h	$–COO^-$	531.30	1.98	44.5
	C=O, $–C(NH_2)=NOH$	532.30	1.82	50.3
	–OH	533.47	1.03	5.20
PAO, 6 h	$–COO^-$	531.21	2.17	60.2
	C=O, $–C(NH_2)=NOH$	532.35	1.63	35.6
	–OH	533.40	1.46	4.21
PAO, 12 h	$–COO^-$	531.30	1.54	34.4
	C=O, $–C(NH_2)=NOH$	532.30	1.94	60.0
	–OH	533.40	1.01	5.55
PAO, 24 h	$–COO^-$	531.20	2.04	55.0
	C=O, $–C(NH_2)=NOH$	532.35	1.56	38.4
	–OH	533.40	1.49	6.65

Table SI-4. Parameters calculated from Langmuir and Freundlich models for U(VI) adsorption on PAO prepared at different amidoximation times.

	Langmuir model			Freundlich model		
	$C_{s,max}$ (mg/g)	b (L/mg)	R^2	K (mg/g)	1/n	R^2
PAO, 1 h	60.0	0.103	0.984	14.8	0.302	0.882
PAO, 2 h	69.0	0.220	0.991	25.6	0.227	0.899
PAO, 3 h	91.2	0.880	0.989	49.2	0.155	0.837
PAO, 4 h	81.2	0.624	0.996	41.3	0.166	0.856
PAO, 6 h	74.2	0.514	0.993	37.0	0.168	0.832
PAO, 12 h	71.4	0.258	0.991	28.2	0.215	0.889
PAO, 24 h	64.4	0.122	0.985	17.7	0.283	0.875