

Table 1. Chemical stability of {P(AN-AM)-NS} dissolved in different solvents for 4 days.

The concentration of solvents, M	% Solubility			
	H ₂ O	HCl	HNO ₃	KOH
0.5	BDL	5.92	6.0	8
1		12.92	12.2	14.1
2		13.67	16.7	20.7
3		24.95	27.04	29.8
4		34.31	PD	PD
6		PD	CD	CD
where BDL, Below detection limit, PD, partially dissolved, and CD, completely dissolved				

Table 2. K_d values and separation factors of various metal ions sorbed onto {P(AN-AM)-NS} at 25 ± 1 °C.

pH	K_d (mL/g) and α	{P(AN-AM)-NS} prepared at 50 kGy				
		Sr^{2+}	Cd^{2+}	Cu^{2+}	Cs^+	Pb^{2+}
1.2	K_d	6.3	2.7	7.1	11.1	23.3
	α^a_b		0.4	1.1	1.8	3.7
				2.6	4.1	8.6
					1.6	3.3
						2.1
2.4	K_d	13.3	10.4	20.3	15.2	78.6
	α^a_b		0.8	1.5	1.1	5.9
				2.0	1.5	7.6
					0.7	3.9
						5.2
3.3	K_d	33.3	30.4	40.0	57.1	138.7
	α^a_b		0.9	1.2	1.7	4.2
				1.3	1.9	4.6
					1.4	3.5
						2.4
4.3	K_d	52.1	66.7	91.7	110.3	1655.6
	α^a_b		1.3	1.8	2.1	31.8
				1.4	1.7	24.8
					1.2	18.1
						15.0
5	K_d	52.2	63.8	91.3	108.8	1625.0
	α^a_b		1.2	1.7	2.1	31.1
				1.4	1.7	25.5
					1.2	17.8
						14.9
6	K_d	50.9	62.9	91.5	109.9	1540.0
	α^a_b		1.2	1.5	1.7	24.5
				1.5	1.7	24.5
					1.2	16.8
						14.0

Table 3. Kinetic parameters of various metal ions on {P(AN-AM)-NS} at 25±1 °C.

Metal ions sorbed	First-order kinetic parameters			Second-order kinetic parameters				q_e , exp. (mg/g)
	$k_t \times 10^{-3}$	q_e , calc. (mg/g)	R^2	$K_S \times 10^{-3}$	$h \times 10^{-2}$	q_e , calc. (mg/g)	R^2	
Pb ²⁺	-8.6	4.63	0.993	8.2	88.4	10.32	0.999	9.86
Cu ²⁺	-13.3	1.83	0.911	39.4	225.3	7.56	0.999	7.4
Sr ²⁺	-9.5	1.60	0.931	29.9	146.6	6.99	0.999	6.9
Cs ⁺	-6.9	0.83	0.959	53.6	225.8	6.48	0.999	6.4
Cd ²⁺	-8.5	1.7	0.981	25.3	64.1	5.03	0.999	4.9

Table 4. Effect of heating temperatures on the capacity of {P(AN-AM)-NS} for various metal ions.

Heating temperature, °C	Weight loss (%)	Pb ²⁺		Cs ⁺		Cu ²⁺		Sr ²⁺		Cd ²⁺	
		IEC	% R	IEC	% R	IEC	% R	IEC	% R	IEC	% R
50	Nil	101.7	100	94.3	100	57.6	100	54.3	100	33.4	100
100	6.18	94.0	92.4	89.1	94.5	50.0	86.8	42.5	78.3	26.0	77.8
200	7.6	83.1	81.7	74.7	79.2	37.2	64.6	35.0	64.5	21.8	65.3
400	49.8	72.8	71.6	61.5	65.2	25.5	44.3	25.0	46.0	12.4	37.1
where IEC is ion exchange capacity (mg/g) and % R is Retention of ion exchange capacity											

Table 5. Thermodynamic parameters for adsorption of various metal ions on {P(AN-AM)-NS}.

Metals sorbed	Temp, K	ΔH° (KJ/mol)	ΔS° (J/mol.K)	ΔG° (KJ/mol)
Pb^{2+}	298	7.4	86.4	-18.4
	308			-19.2
	318			-20.1
	328			-21.0
	338			-21.8
Cs^+	298	13.2	83.2	-11.6
	308			-12.4
	318			-13.3
	328			-14.1
	338			-14.9
Cu^{2+}	298	9.9	70.9	-11.3
	308			-12.0
	318			-12.7
	328			-13.4
	338			-14.1
Sr^{2+}	298	11.5	71.6	-9.8
	308			-10.5
	318			-11.2
	328			-12.0
	338			-12.7
Cd^{2+}	298	8.4	62.8	-10.3
	308			-10.9
	318			-11.6
	328			-12.2
	338			-12.8