

Supplementary Material

Micro-encapsulation of rare earth metal ions doped magnesia based alginate/pectin hybrid polymeric composites for defluoridation of water

Antonysamy Jeyaseelan^a, Natrayasamy Viswanathan^{a*}, Ilango Aswin Kumar^b,

Mohammad Rafe Hatshan^c

^aDepartment of Chemistry, Anna University, University College of Engineering - Dindigul, Reddiyarchatram, Dindigul - 624 622, Tamilnadu, India.

^bDepartment of Environmental and Sustainable Engineering, University at Albany, State University of New York, Albany, New York 12222, United States.

^cDepartment of Chemistry, College of Science, King Saud University, P.O. Box 2455, Riyadh 11451, Saudi Arabia

* Corresponding author. Tel.: +91-451-2554066; fax: +91-451-2554066.

E-mail address: drnviswanathan@gmail.com (N.Viswanathan)

Table S1. Kinetic studies of PAML composite for fluoride adsorption.

Kinetic models	Parameters	303 K				313 K				323 K			
		8 mg/L	10 mg/L	12 mg/L	14 mg/L	8 mg/L	10 mg/L	12 mg/L	14 mg/L	8 mg/L	10 mg/L	12 mg/L	14 mg/L
Pseudo-first-order	k_{ad} (min^{-1})	0.487	0.493	0.499	0.504	0.491	0.496	0.502	0.507	0.493	0.500	0.505	0.511
	r	0.762	0.769	0.776	0.781	0.768	0.774	0.780	0.786	0.772	0.777	0.784	0.791
	sd	0.298	0.303	0.309	0.316	0.302	0.307	0.313	0.321	0.306	0.312	0.318	0.326
Pseudo-second-order	q_e (mg/g)	4.515	4.521	4.527	4.531	4.519	4.526	4.530	4.536	4.523	4.528	4.534	4.542
	k (g/mg min^{-1})	0.304	0.310	0.314	0.319	0.309	0.312	0.318	0.322	0.311	0.317	0.320	0.327
	h (mg/g min^{-1})	3.004	3.009	3.012	3.018	3.007	3.011	3.016	3.022	3.010	3.014	3.019	3.025
	r	0.901	0.906	0.910	0.917	0.904	0.909	0.913	0.921	0.908	0.911	0.917	0.924
	sd	0.189	0.193	0.198	0.204	0.191	0.196	0.202	0.210	0.194	0.199	0.207	0.215
Particle diffusion	k_p (min^{-1})	1.008	1.012	1.017	1.022	1.011	1.015	1.020	1.026	1.014	1.018	1.024	1.030
	r	0.803	0.808	0.813	0.816	0.807	0.811	0.816	0.822	0.810	0.813	0.819	0.825
	sd	0.397	0.401	0.404	0.408	0.399	0.402	0.407	0.412	0.400	0.405	0.410	0.416
Intra particle diffusion	k_i ($\text{mg/g min}^{0.5}$)	3.045	3.052	3.058	3.064	3.049	3.054	3.060	3.069	3.052	3.059	3.065	3.074
	r	0.908	0.912	0.919	0.923	0.911	0.916	0.920	0.926	0.914	0.919	0.924	0.931
	sd	0.184	0.189	0.194	0.201	0.188	0.192	0.197	0.206	0.190	0.196	0.201	0.210

Table S2. Kinetic studies of PAMC composite for fluoride adsorption.

Kinetic models	Parameters	303 K				313 K				323 K			
		8 mg/L	10 mg/L	12 mg/L	14 mg/L	8 mg/L	10 mg/L	12 mg/L	14 mg/L	8 mg/L	10 mg/L	12 mg/L	14 mg/L
Pseudo-first-order	k_{ad} (min ⁻¹)	0.411	0.417	0.422	0.428	0.415	0.419	0.423	0.432	0.418	0.421	0.427	0.436
	r	0.718	0.724	0.730	0.736	0.722	0.728	0.735	0.742	0.726	0.732	0.739	0.746
	sd	0.319	0.324	0.329	0.333	0.321	0.328	0.331	0.337	0.325	0.330	0.335	0.341
Pseudo-second-order	q_e (mg/g)	4.447	4.452	4.458	4.463	4.450	4.455	4.461	4.467	4.454	4.459	4.465	4.473
	k (g/mg min ⁻¹)	0.298	0.301	0.306	0.312	0.300	0.303	0.310	0.316	0.302	0.308	0.313	0.321
	h (mg/g min ⁻¹)	2.964	2.970	2.976	2.981	2.967	2.974	2.979	2.985	2.971	2.978	2.983	2.992
	r	0.907	0.914	0.920	0.925	0.912	0.918	0.924	0.932	0.917	0.922	0.928	0.935
Particle diffusion	sd	0.176	0.182	0.187	0.193	0.179	0.183	0.189	0.198	0.181	0.186	0.194	0.203
	k_p (min ⁻¹)	1.002	1.007	1.011	1.016	1.005	1.012	1.016	1.021	1.009	1.013	1.018	1.022
	r	0.829	0.834	0.839	0.843	0.832	0.837	0.841	0.848	0.836	0.840	0.845	0.852
Intra particle diffusion	sd	0.371	0.377	0.381	0.385	0.376	0.379	0.383	0.389	0.377	0.382	0.386	0.391
	k_i (mg/g min ^{0.5})	3.008	3.013	3.019	3.024	3.011	3.017	3.022	3.027	3.015	3.021	3.025	3.032
	r	0.914	0.919	0.924	0.930	0.917	0.923	0.927	0.935	0.921	0.924	0.930	0.941
	sd	0.168	0.173	0.179	0.183	0.171	0.176	0.182	0.188	0.174	0.180	0.186	0.192