Supplementary material

TiO_2 microspheres impregnated alginate: A novel hybrid sorbent for uranium removal from aquatic bodies

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BET surface area determination of TiO2 microspheres:

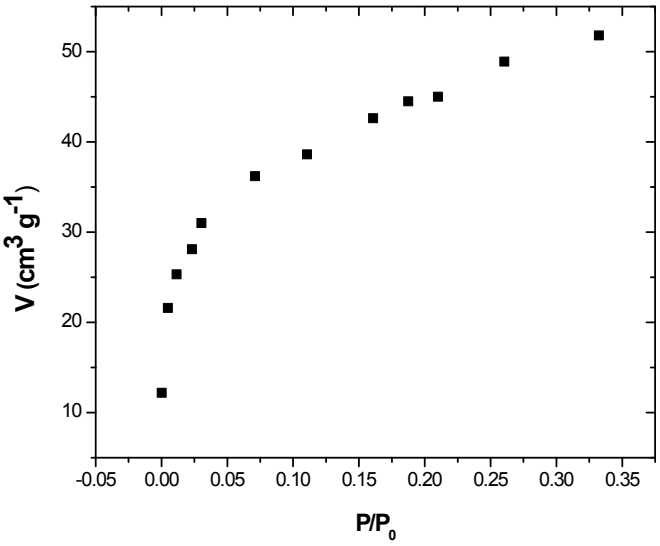

Fig. S1: BET plot of TiO_2 microspheres

Composition and stability of the beads

To study the effect of TiO_2 MS loading on calcium alginate for the sorption of U, loading was varied from 1 to 50 wt.% and it was observed that 18% loading of SM in 4% Ca-ALG is optimum. When the loading exceeded 20 %, integrity of the beads was affected and showed a tendency to be brittle.

Effectiveness of Cal-Alg-TiO_2 MS beads for real water samples

Table S1: U concentration in the spiked groundwater samples before and after treatment with the beads

Sample Id	U concentration before treatment	U concentration after treatment
Groundwater 1 (Mumbai, India)	1 μg mL^{-1} (spiked)	Not detected (< 10 ng mL^{-1})
Groundwater 2 (Punjab, India)	110 ng mL^{-1} (natural)	Not detected (< 10 ng mL^{-1})

Monitoring of drinking water quality after treatment with the Cal-Alg-TiO_2 MS beads and

Table S2: Physicochemical parameters of groundwater samples before and after treatment of groundwater with Cal-Alg-TiO_2 MS beads

Parameters	Before treatment	After treatment
pH	6-8	6-8
Conductance (mS)	286-435	297-478
Redox potential (mV)	96-126	101-141
DOC (mg L^{-1})	6-10	6-11
Ti (μg L^{-1})	10-234	12-238
Cl (mg L^{-1})	14-21	12-24
Si (mg L^{-1})	26-42	25-40
Fe (mg L^{-1})	2-5	1-5
Ca (mg L^{-1})	40-49	41-50
Na(mg L^{-1})	22-28	23-28

Note: The range of the concentration values reported have been derived from analysis of five different groundwater samples.

Comparison of sorption capacities

Table S3: A comprehensive comparison of the developed material with the earlier reported sorbents for the uranium uptake

Adsorbent	U adsorbent capacity (mg g^{-1})	References	Reference no.
Cal-Alg-TiO_2 MS beads	31.4	This study	-
HA-MCNP composite	47.9	Basu et. al.	8
GO-Ca-Alginate	29.4	Basu et. al.	6
LDO-C	354.2	Yao et. al.	56
Titanate nanowire	358	Yin et. al.	57
Silica microsphere	30	Basu et. al.	41
Organosilica-Phosphonate Hybrids	54-56	Lebed et. al.	58
Silicate RUB-15	152	Chen et. al.	59
Carbon nitride composite	60.51	Wang et. al.	60
Cal-Alg-Chitosan	36.04	Basu et. al.	40
Amberlite IRA-402 resin	213	Solgy et. al.	61
Goethite	66.66	Chegrouche et. al.	62
Activated carbon	45.24	Morsy et. al.	63
Graphene oxide nanosheets	299	Li et. al.	64