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Highly efficient removal of TiO_2 nanoparticles from aquatic bodies by silica microspheres impregnated Ca-alginate

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Evidence of the stability of the bead:

Fig: 6 months old Cal-Alg-SM beads

Fig: Dried and 6 months old Cal-Alg-SM beads

Sherrer analysis for the size determination of TiO_2 NP:

$$D_p = \frac{0.94 * \lambda}{FWHM * Cos\theta}$$

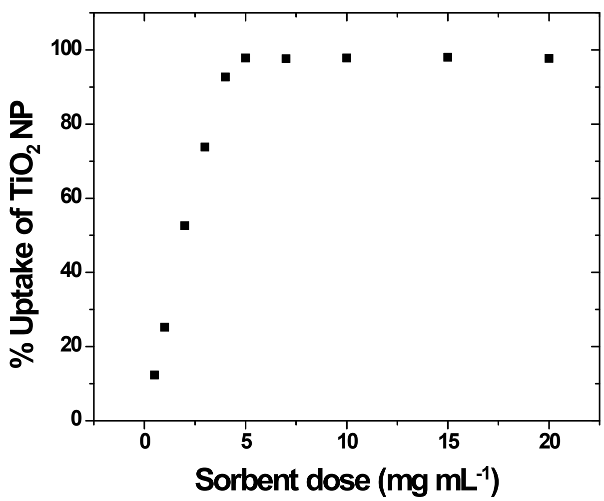
Where, D_p= Average crystallite size, λ =1.54 Å, θ= Bragg angle

From the most intense peak at the XRD of TiO_2 NP, the required parameters (FWHM, θ) were obtained and D_p was calculated as follows:

2θ	FWHM	Size (nm)
25.5946	0.293	29.04

The effect of dose:

The effect of dose of sorbent was studied under the fixed concentration of TiO_2NP (100 µgmL^{-1}), pH 4-5 keeping the contact time at 8h. The result is given below. It shows that the percentage uptake initially increases up to dose rate of 5 mg g^{-1} thereafter becomes almost constant. So dose rate of 5 mg g^{-1} is used for most of the experiments.



Pore size distribution:

The following figures show the pore size distribution of silica microspheres (SM) and Cal-Alg-SM beads derived from BET isotherm (Instrument model: Surfer; Thermo Scientific).

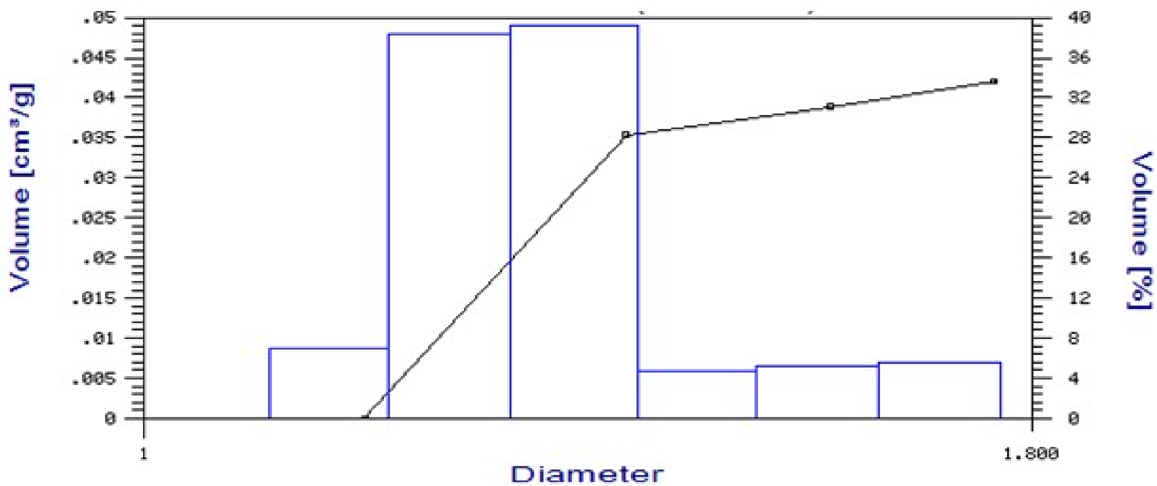


Fig: Pore size distribution of silica microsphere

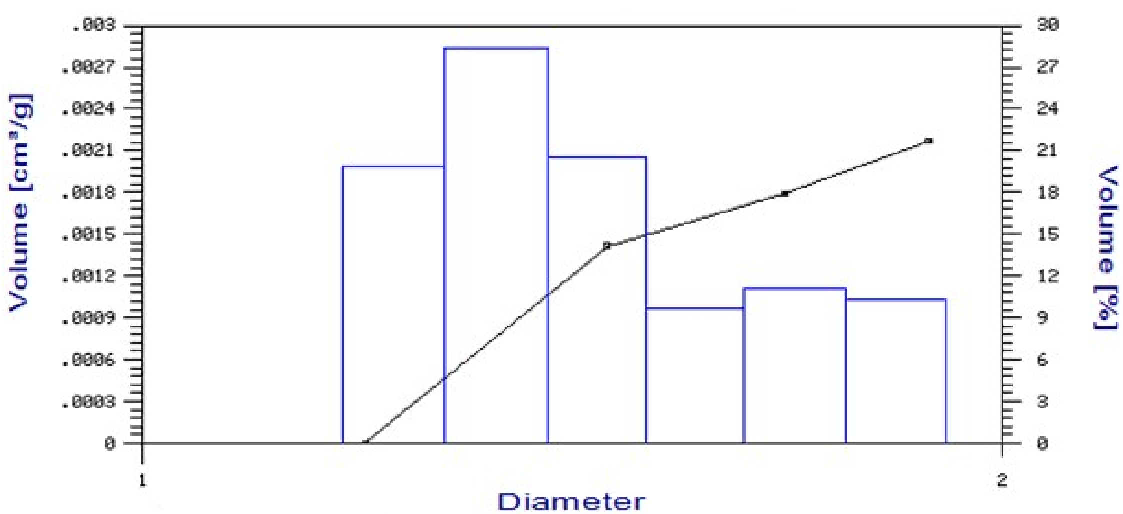


Fig: Pore size distribution of Cal-Alg-SM beads