

## Effective coating of polyethyleneimine on hollow polysilsesquioxane spheres for high performance anionic dyes and Cr(VI) removal

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### ABSTRACT

A novel polyethyleneimine functionalized polysilsesquioxane adsorbent is developed via a facile “covalent grafting” approach. Due to the amine groups-rich surface, the resulting hollow adsorbent (H-PVTMS-PEI) exhibited high adsorption capacities and fast adsorption kinetics toward Cr(VI) ( $392.2 \text{ mg g}^{-1}$ ;  $< 125 \text{ min}$ ) and Congo Red ( $971.4 \text{ mg g}^{-1}$ ;  $< 100 \text{ min}$ ). In addition, H-PVTMS-PEI maintained high selectivity in capturing Cr(VI) contaminants from mixed Cr(VI), Zn(II), Co(II) and Cd(II) aqueous solutions. It was also observed that the H-PVTMS-PEI exhibited excellent regeneration ability. Besides, removal mechanism involved was also investigated based on the characterization analyses. In summary, this hollow polysilsesquioxane@PEI has the potential to be used as an efficient adsorbent for the broad application in remediation of coexisting toxic water pollution.

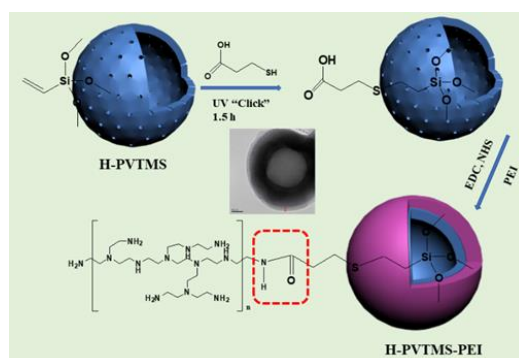


Fig. 1 Illustration of the synthetic procedure for hollow polysilsesquioxane@PEI

### REFERENCE

Dong, F.P., Guo, W.P., Park, S.S. and Ha, C.S. (2011), “Uniform and monodisperse polysilsesquioxane hollow spheres: synthesis from aqueous solution and use in pollutant removal”, *Journal of Materials Chemistry.*, **21**(29), 10744-10749.

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