Removal of phosphate using SBA-15 synthesized in a flow reactor

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Phosphate is an essential nutrient which in excess leads to eutrophication, hence, the removal and recovery from water streams has significant benefits. Adsorption of phosphate using mesoporous materials like SBA-15 is an effective and economical approach. Generally, SBA-15 synthesized in batch reactors are not uniform due to the inhomogeneity in concentration and temperature and also the process period is up to four days. Herein, we used continuous flow system, where the products are formed uniformly with the 1% of process time of batch system. The concentration ratio of reactants and reaction times are the critical parameters to control the formation and growth of hexagonal structure of SBA-15. The prepared SBA-15 is amine grafted (SBA-15G) to increase the adsorption capacity of phosphate. Both samples were analyzed using XRD, XPS, TEM and BET analysis. The adsorption capacity of SBA-15 & SBA-15G are determined with equilibrium experiments