

## عنوان مقاله:

Modified Porous Silicon with Zirconium Nanoparticles as a Selective Adsorbent for Phosphate Removal from Aqueous Systems

## محل انتشار:

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## خلاصه مقاله:

The development of an efficient adsorbent for phosphate removal from wastewater to prevent the eutrophication of surface waters is very important. In this study, porous silicon powder prepared with acidic etching solution (HF: HNO<sub>3</sub>: H<sub>2</sub>O). Then, Zirconium-modified porous silicon has been synthesized by a simple and low-cost hydrothermal process. The morphology and structure of the samples were investigated using scanning electron microscopy (SEM), X-ray diffraction (XRD). This material has been used as an adsorbent for phosphate ion (PO<sub>4</sub><sup>3-</sup>) removal from synthetic aqueous solutions. The effect of operating conditions such as contact time, initial anion concentration, pH, the presence of competitive ions on the adsorption performances and the regeneration of the adsorbent have been investigated. Maximum adsorption amount of 47.7 mg P/g has been obtained at ambient temperature. The maximum removal of phosphate was reached at pH= 4 for Zirconium-modified porous silicon. The adsorption was almost unaffected by the presence of competitive ions. Regeneration tests have shown that the adsorbent retains its capacity .after 3 adsorption-desorption cycles

## کلمات کلیدی:

Chemical etching, porous Silicon, Zirconium, Eutrophication

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