

Ion-exchange promoted selective adsorption of Sr(II): An approach for selective adsorption

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Here in we demonstrate the adsorption of Sr(II) in an open environment using a highly porous sodium nonatitanate (SN). Highly porous SN was synthesized by the hydrothermal route in presence of sodium hydroxide along with titanium isopropoxide. SN was characterized by X-ray diffraction analysis, X-ray photoelectron spectroscopy and surface area analysis. From the analysis, we observed the formation of microporous structure formed. We examined the adsorption studies, using response surface methodology (RSM). The effect of pH, concentration of adsorbent and adsorbate along with the contact time was evaluated. Using the RSM approach, we obtained optimum conditions which favors the high adsorption rates (pH 8, 12 h and 55 ppm). From the observed behaviour, we propose an ion-exchange mechanism for the adsorption of Sr ions. The hydrated radius of the sodium ion (2.76 Å) matched well with that of the Sr ions (4.12 Å), this close proximity in the hydrated radius favors the ion-exchange mechanism.