Study of Strontium Sorption onto Indian Bentonite

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Abstract : Incessant industrial growth fulfill the energy demand of present day society, at the same time it produces huge amount of waste which could be hazardous or non-hazardous in nature. These wastes are coming out from different sources viz, nuclear power, thermal power, coal mines which contain different types of contaminants and one of the emergent contaminant is strontium, used in the present study. The isotope of strontium (Sr90) is radioactive in nature with half-life of 28.8 years and permissible limit of strontium in drinking water is 1.5 ppm. Above the permissible limit causes several types of diseases in human being. Therefore, safe disposal of strontium into ground becomes a biggest challenge for the researchers. In this context, bentonite is being used as an efficient material to retain strontium onto ground due to its specific physical, chemical and mineralogical properties which exhibits higher cation exchange capacity and specific surface area. These properties influence the interaction between strontium and bentonite, which is quantified by employing a parameter known as distribution coefficient. Batch test was conducted, and sorption isotherms were modelled at different interaction time. The pseudo first-order and pseudo second order kinetic models have been used to fit experimental data, which helps to determine the sorption rate and mechanism.

Keywords : bentonite, interaction time, sorption, strontium
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