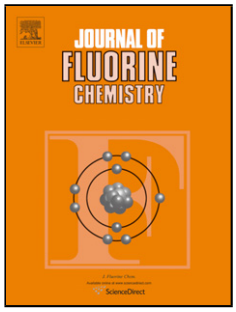

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FLUORIDE ADSORPTION FROM AQUEOUS SOLUTION USING A PROTONATED CLINOPTILOLITE AND ITS MODELING WITH ARTIFICIAL NEURAL NETWORK-BASED EQUATIONS

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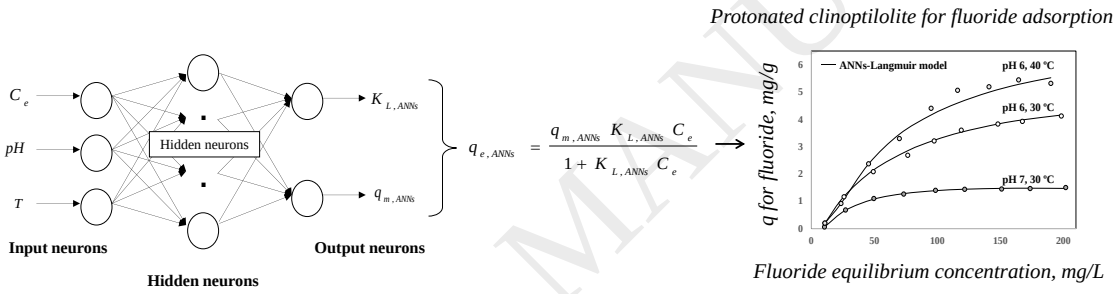
GRAPHICAL ABSTRACT



HIGHLIGHTS

- Protonated clinoptilolite have been used for water defluoridation
- Fluoride adsorption capacities of protonated clinoptilolite were better than those of other modified zeolites
- New hybrid ANNs models were proposed to fit the fluoride adsorption on protonated clinoptilolite

ABSTRACT. Water defluoridation properties of a protonated clinoptilolite has been studied and analyzed. This adsorbent has been obtained by a thermochemical treatment with NH_4Cl to protonate the zeolite surface and to increase its specific surface area. Results of adsorption kinetics and isotherms showed that the defluoridation properties of this protonated clinoptilolite were better than those reported for raw and modified zeolites with multivalent cations such as aluminum or iron. Defluoridation performance of this protonated clinoptilolite was endothermic and increased at acidic conditions in contrast to other zeolites modified with multivalent cations that should operate at pH ≥ 7 to maintain the adsorbent chemical stability. In addition, new models have been also developed to