

# FLUORIDE REMOVAL EFFICIENCY OF CO-PROCESS OF DOLOMITE ADSORPTION AND NANOFILTRATION MEMBRANE

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**SUMMARY:** Dolomite adsorption and nanofiltration membrane co-process for fluoride removal from water was studied. Dolomite with a diameter of 0.42 mm was utilized as an adsorbent. NF-1 membrane was employed in filtration process. Properties of dolomite sorbent and NF-1 membrane were determined. Point of zero charge (PZC), specific surface area, and average pore size of dolomite were observed at pH 8.5, 1.17 m<sup>2</sup>/g, and 105.7 Å, respectively. Major components of dolomite sorbent included dolomite, calcite, and quartz. Dolomite adsorption process showed 12 hrs of an equilibrium contact time and fitted with pseudo-second order kinetic reaction at a rate constant of 21.07 g/m M·min. NF-1 membrane showed an isoelectric point at pH 6.0. Pure water permeability and mass transfer coefficient of NF-1 membrane were 3.66 m<sup>3</sup>/m<sup>2</sup>·day·MPa and 1.539 m<sup>3</sup>/m<sup>2</sup>·day, respectively. Groundwater with 12.14-15.38 mg/L of fluoride from Lamphun Province, Thailand was collected and experimented. The co-process provided 71% of fluoride rejection (9% by dolomite adsorption and 62% by NF-1 membrane). Interestingly, pH adjustment of defluoridated water after the adsorption process to pH 7.0 prior to NF-1 membrane filtration could improve the fluoride rejection efficiency moderately with up to 78%.

Key words: Defluoridation, Dolomite adsorption, Mass transfer coefficient, Nanofiltration membrane, Pseudo-second order.

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