



Degradation of humic acid by ZVI based sono-Fenton as a pretreatment for reducing organic fouling likely in membrane distillation

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ABSTRACT

Zero valent iron (ZVI) being a novel initiator and catalyst for Fenton process has abilities to adsorb and partially oxidize organic impurities while using dissolved oxygen in water. The oxidation potential of ZVI is enhanced in case of addition of hydrogen peroxide and further catalyzed while using sonication. ZVI being source of Fe^{2+} ion produces $\bullet OH$ radical (whose oxidation potential is utmost in comparison with other oxidizing species) steadily while using H_2O_2 . Since membrane distillation faces wetting problem due to either interaction of organic impurities which eventually turn into organic fouling while presence of inorganic salts in seawater (SW) may hinder degradation of organics. For this purpose, ZVI based sono-Fenton treatment was chosen to evaluate its performance for degradation of humic acid (HA) as organic foulant within SW. Concentration of hydrogen peroxide, amount of ZVI and pH were varied to get optimum results. In previous researches, Fenton worked well in acidic pH in limited other species, however here near neutral pH from 6 to 8 was tried. Even though, 67% HA degradation was successfully achieved by using 2 g/L of ZVI with 20 mM H_2O_2 at pH 6.

Keywords: Humic acid; Organic fouling; Sono-Fenton; Zero valent iron; Pretreatment for membrane distillation

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