Effect of pretreatment on membrane fouling and VMD performance in the treatment of RO-concentrated wastewater

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ABSTRACT

The polyvinylidene fluoride hollow fiber hydrophobic membrane was applied in vacuum membrane distillation (VMD) process for the treatment of reverse osmosis-concentrated wastewater from a steel plant. The effects of pretreatment methods on the COD\(_{cr}\) removal, the performance and membrane fouling of VMD process were studied. The morphology and composition of the fouling layer were studied by scanning electron microscope and energy dispersive spectroscopy, respectively. The reason for the flux declination in VMD process was discussed. The results showed that the COD\(_{cr}\) removal reached 40%, and the flux of VMD process was increased after the pretreatment of coagulation and ultrafiltration, when the concentration factor reached eight, the flux of VMD process using properly pretreated solution was 30% higher than that using un-pretreated solution as the feed. The membrane surface morphology and elemental analysis testified that the fouling of membrane surface was obviously alleviated by pretreatment.

Keywords: Vacuum membrane distillation; RO-concentrated wastewater; Coagulation; Pretreatment; Membrane fouling

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