Surface modification of nanofiltration membrane for reduction of membrane fouling

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ABSTRACT

Membrane fouling is a major drawback to any membrane system. Fouling reduces the membrane flux either temporarily or permanently. Unfortunately, it is impossible to produce zero-fouling membranes but minimization of membrane fouling can be done efficiently. Membrane surface modification is one of the most often used methods to increase membrane resistance to fouling. The three major parameters that affect the membrane fouling are hydrophilicity, surface charge and surface roughness. Besides that, some researchers also suggest that two other parameters which should be taken into account are chemical composition and porosity. In this study, the first three major parameters mentioned above only are considered as contributing to fouling. Usually, these three parameters are characterized by three different techniques (hydrophilicity by contact angle measurement, surface roughness by atomic force microscopy (AFM) and surface charge by zeta potential). This study concentrates on characterising effect of surface roughness alone. Commercial polyethersulfone (PES) nanofiltration membranes with and without surface modification were characterized and humic acid was chosen as the foulants.

Keywords: Fouling; Nanofiltration; Surface modification; AFM

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