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**Effect of formation of micro reaction locations (MRLs) on properties of  
polyvinylidene fluoride (PVDF) membranes**

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**Abstract**

Micro reaction locations (MRLs) formed in membrane impact the integrated properties of membrane. In this paper, in order to form effective MRLs in PVDF membrane which performs attractive properties,  $Y_xFe_yZr_{1-x-y}O_2$  solid superacid coated  $TiO_2$  nanotubes (MSYFZr-TiNs) modified by sodium dodecylbenzene sulfonate (SDBS) are embedded into PVDF to prepare MSYFZr-TiNs/PVDF composite membranes with effective MRLs inside channels and on the surface of membranes. MSYFZr-TiNs and MSYFZr-TiNs/PVDF composite membranes are characterized and tested. The results show that  $Y_xFe_yZr_{1-x-y}O_2$  solid superacid with stable tetragonal phase reaches a hammett acidity of -16.468, decomposing inorganic pollutants or restraining their formation inside channels and surface. The MSYFZr-TiNs/PVDF composite membranes with MRLs perform attractive anti-compaction and anti-fouling properties through MRLs. The water contact angle, stable degradation ratios for oil and  $Fe_2O_3$  are 36.5°, 13.2% and 12.1%, respectively. Furthermore, when treating oily wastewater, the membrane permeate flux and

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