

GRAVITY DRIVEN ULTRAFAST REMOVAL OF ORGANIC CONTAMINANTS ACROSS CATALYTIC SUPERWETTING MEMBRANE

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Herein, flexible, magnetic and hierarchical porous catalytic carbon nanofibrous membranes (MnO/Co@SiO₂-CNFMs) driven by gravity were prepared by co-electrospinning technique and self-reduced pyrolysis. Benefiting from the active metals and precursor carrier design, the composite active MnO/Co crystals can be directly produced without any reducing gases and easily migrate to carbon nanofiber surface during the carbonization process. Meanwhile, the silica nanoparticles (SiO₂ NPs) doped in carbon nanofibers (CNFs) can maintain the carbon nanofiber structure without obvious shrinkage as well as transmit and scatter the outer stress, which endowed the membrane with robust flexibility. The as-prepared MnO/Co@SiO₂-CNFM exhibited a superhydrophilic surface with a water contact angle of 0°, fast water flux of 752±28 L/m²·h, prominent catalytic performance with a high degradation efficiency over 99.5% toward methylene blue (MeB). Most importantly, the amount of wastewater treated by gravity driven catalytic membrane was about four times the static degradation without external driven force. Furthermore, four typical refractory pollutants (phenol, bisphenol-S, chlorophenol

and sulfaethoxazole) also can be efficiently degraded by gravity driven MnO/Co@SiO₂-CNFMs/PMS system. This study is meaningful for the development of novel catalytic membrane with high efficiency and low energy consumption for wastewater treatment.

Biography

Zhigao Zhu is a Doctoral candidate of School of Environmental from Harbin Institute of Technology (HIT), China. He has completed his Master's degree from Donghua University (DHU), China. His major is Environmental Engineering and his research focuses of selectivity wettable porous membranes for various applications such as oil-water separation, membrane distillation, waterproof & breathable fabric membrane, filtration catalytic oxidation of persistent organic contaminants in water and wastewater. Until now, he has published nine papers as first or co-first author in reputed journals like *Environmental Science and Technology*, *Environmental Science: Nano*, *Chemical Engineering Journal*, *ACS Applied Materials & Interfaces*, *Journal of Materials Chemistry A* etc.

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