

Photocatalytic PVDF/TiO₂:Au nanostars membranes for ciprofloxacin degradation in water remediation

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Abstract

Photocatalysis has been considered as one of the most promising technologies for wastewater treatment because it is costless, eco-friendly and efficient in the removal of recalcitrant contaminants [1]. Titanium dioxide (TiO₂) is one of the most used photocatalysts due to its remarkable properties. However, its applicability is limited by its wide bandgap (3.0–3.2 eV) which results in poor efficiency upon visible light irradiation [1,2]. Although many works use the spherical Au nanoparticles to overcome this limitation, the absorption wavelength is still limited in the 500–550 nm [1]. On the other hand, the reuse and recovery of photocatalysts to avoid the possible secondary pollution coming from the nanoparticles are also a significant challenge [2]. Herein, we developed polymer (PVDF) highly porous membranes that incorporate nanocatalysts of TiO₂:Au with a branched morphology (TiO₂:Au-NSs) that make use of all the visible light spectrum to efficiently reuse for water treatment in the antibiotic ciprofloxacin degradation.

References

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- [2] Salazar H., Martins P. M., Santos B., Fernandes M. M., Reizabal A., Sebastian V., Botelho G., Tavares C. J., Vilas-Vieira J. L., Lanceros-Mendez S., *Chemosphere*, 250 (2020) 126299.

Figures

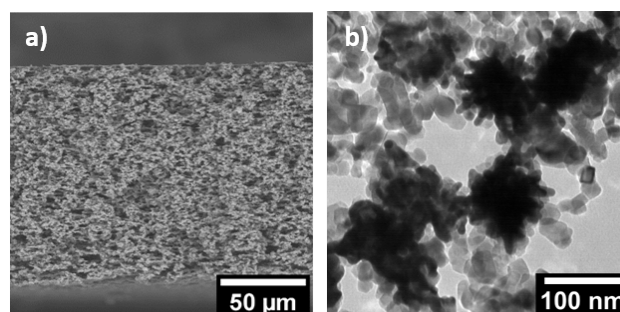


Figure 1: a) SEM image of PVDF-HFP membrane section. b) TEM image of TiO₂:Au-NSs

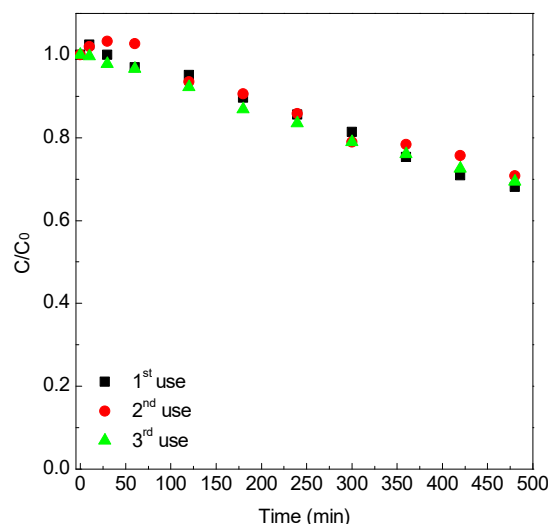


Figure 2: Reusability study of PVDF-HFP membrane containing 10% TiO₂:Au-NSs in ciprofloxacin degradation under visible light.