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A graphene oxide-based nanofiltration membrane for the catalytic abatement of organic pollutants in wastewater.

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Ce-doped strontium ferrate ($Sr_{0.85}Ce_{0.15}FeO_{3-\delta}$) is a perovskite, which can generate reactive oxygen species for the abatement of water micropollutants with no need of an external light source [1]. Therefore, this perovskite has been used to degrade different water pollutants at mild temperatures, and we have recently coupled this technology with membrane distillation [2] and nanofiltration. In this work, we combined this perovskite with a proper amount of graphene oxide in a nanocomposite, achieving enhanced degradation rate in the abatement of a model water pollutant, namely bisphenol A. Hence, nanofiltration membranes were fabricated by depositing thin films of this nanocomposite material over a commercial polyethersulfone ultrafiltration sheet. The membrane was tested with model solutions and a real wastewater effluent, showing rejection > 98% towards bisphenol A and water permeance comparable to commercial nanofiltration membranes. When tested at 50 °C, the membrane showed the ability to degrade bispenol A. The figure presents the bisphenol A concentration in feed and permeate for three replicas of a bisphenol A degradation experiment, making evident the good reproducibility of performances for different membrane samples, also when prepared from separated batches. The data obtained in this work suggest that the new membrane can be conveniently used for treating contaminated wastewaters that have already a thermal content or that can be heated on-site by recovering low-grade waste heat (as for many industrial effluents). The results presented at this conference were obtained in the frame of two European projects: H2020-MSCA-ITN-2017 (AQUAlity, Grant Agreement n. 765860) and H2020-CIRC-2017TwoStage (Project Ô, Grant Agreement n. 776816).

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[2] K. Janowska, V. Boffa, M. K. Jørgensen, C. A. Quist-Jensen, F. Hubac, F. Deganello, F. E. B. Coelho, and G. Magnacca, "Thermocatalytic membrane distillation for clean water production," *npj Clean Water*, 3 (2020) 1–7.