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**Design and optimization of a photocatalytic reactor for water
purification combining optical fiber and membrane technologies**

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Abstract

Focusing on the system design and its operation optimization, the upgrading of the photocatalytic membrane water purification reactor was proposed. Energy autonomy was possible by using optical fibers that replaced the expensive UV lamps. The up scaled device is able to exploit the solar radiation and manage large water treatment capacity by using a number of multichannel membranes. Following a fluid mechanic approach, the pressure along the membranes was determined, and a computational code was developed that calculates the requested pressure drop in relation to water volumetric flow and system geometry. The obtained results are consistent with final upscale goal aiming at implementing future demonstration of such technology for the treatment of 50 cubic meters of contaminated water per day.

Keywords: membrane reactor; scale up; emerging pollutants; photocatalytic water purification.

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