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## Gas separation with mixed matrix membranes obtained from MOF UiO-66-graphene oxide hybrids

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### Abstract

UiO-66-GO hybrids were obtained by hydrothermal synthesis of MOF UiO-66 (a Zr terephthalate) on graphite oxide (GO). These hybrids with appropriate texture and presence of nanosized MOF particles (in the ca. 30-100 nm range) have been used as fillers to prepare mixed matrix membranes (MMMs) with two different polymers, polysulfone (PSF) and polyimide (PI), as the matrixes, with contents varying between 0 and 32 wt%. The MMMs were applied to the separation of H<sub>2</sub>/CH<sub>4</sub> and CO<sub>2</sub>/CH<sub>4</sub> mixtures at different temperatures (35, 60 and 90 °C). Besides finding a good filler-polymer interaction, in the particular case of the hybrid filler, the barrier effect of the GO and the microporosity of the MOF dominated the separation properties of the MMMs. In all cases (different MMMs and separation mixtures) the effect of the temperature was to increase the permeability with a simultaneous decrease in the corresponding selectivity. In terms of permselectivity, the best H<sub>2</sub>/CH<sub>4</sub> separation results were obtained (at 35 °C) with a PI based MMM containing only UiO-66 as filler (H<sub>2</sub> permeability of 73 Barrer and

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