

## Highly effective and reusable sulfonated pentablock copolymer nanocomposites for water purification applications.

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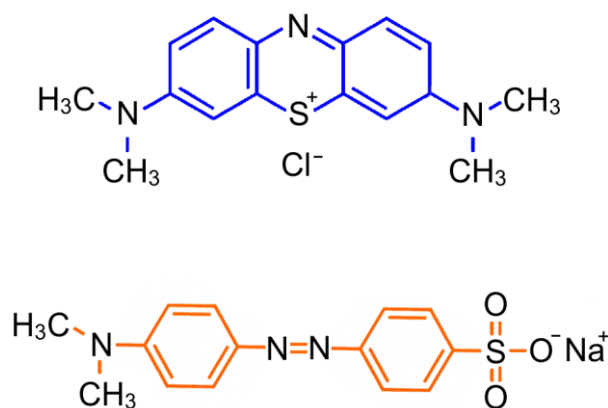
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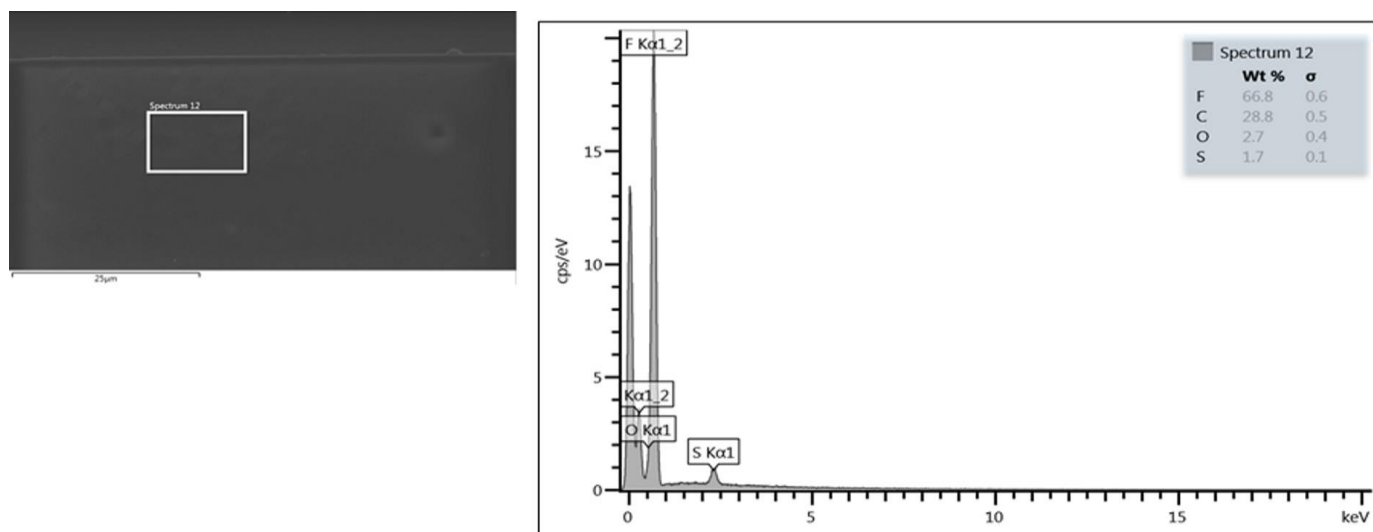
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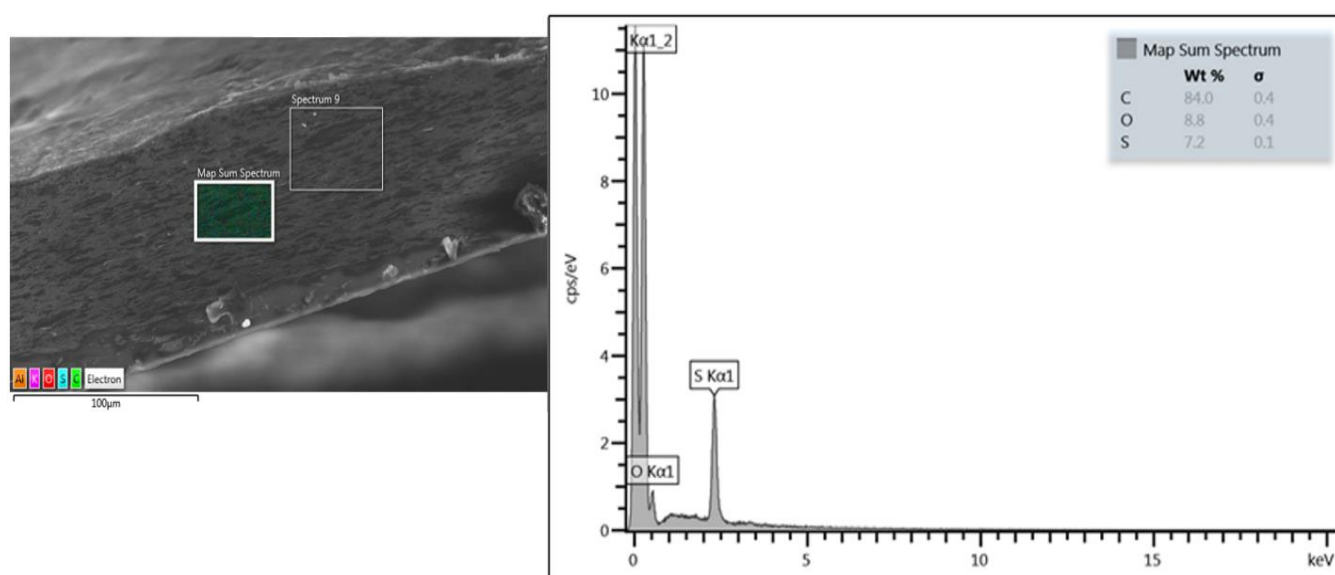
### Supporting Information

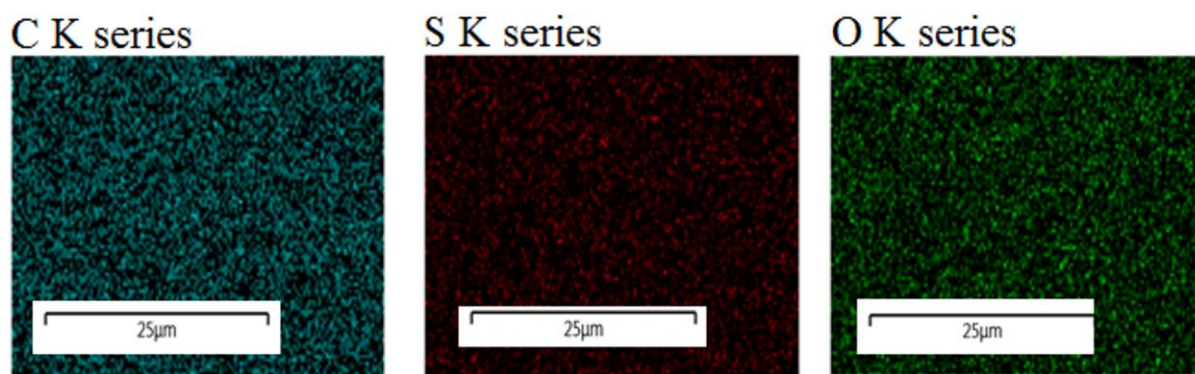


**Figure S1** - Scheme of Methylene Blue (top) and Methyl orange (down) azo dyes.

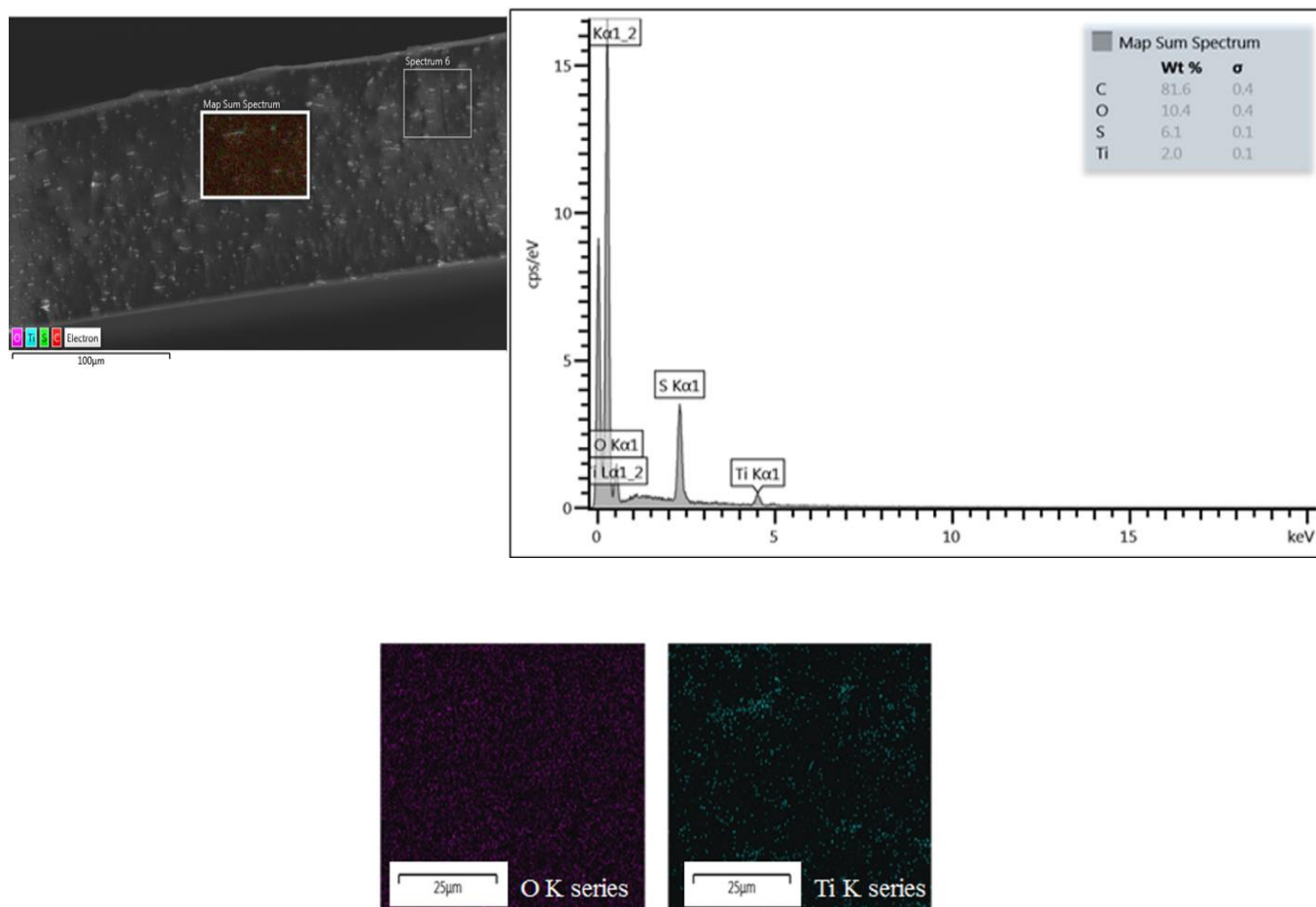


**Figure S2.A** - SEM image of the cross section of the Kraton membrane and the corresponding EDX spectrum. The table with the wt% of the element is reported in the inset of the EDX spectrum.





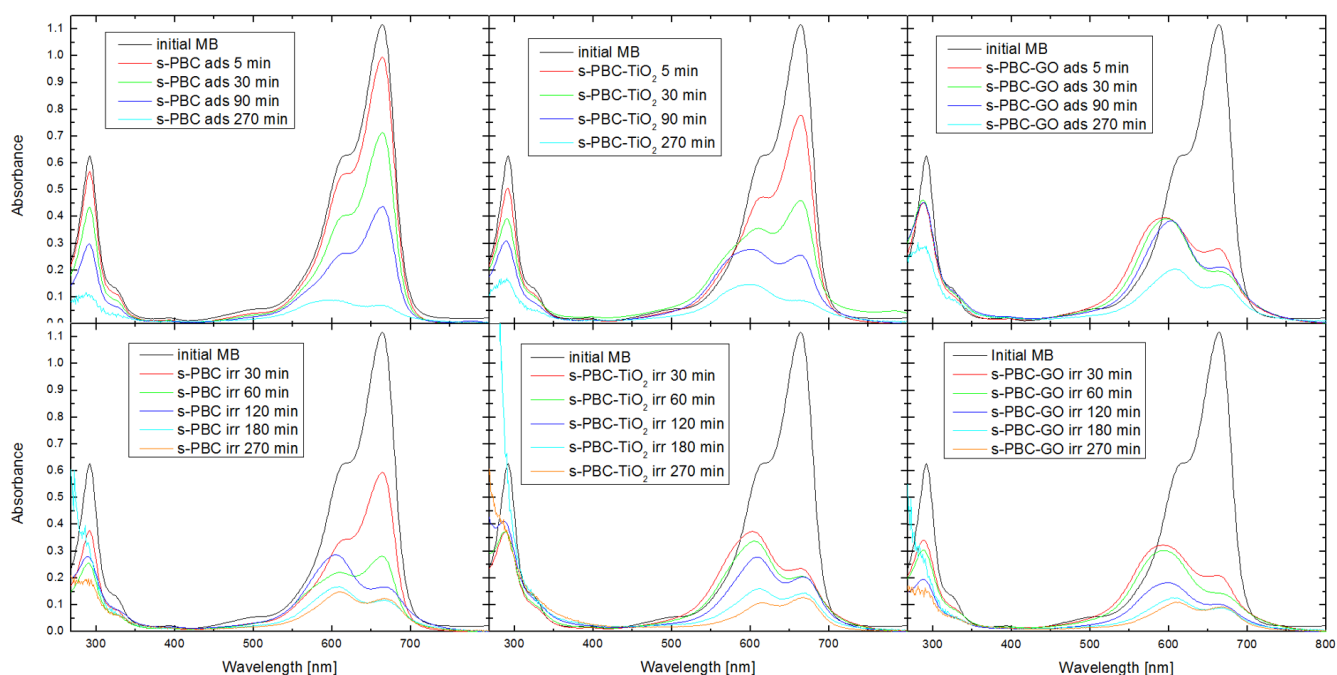
**Figure S2.B** - SEM image of the cross section of the Kraton-GO membrane and the corresponding EDX spectrum. The table with the wt% of the element is reported in the inset of the EDX spectrum. The elemental maps are also reported on the bottom of the figure. GO is homogeneously dispersed in the entire section of the polymeric matrix.



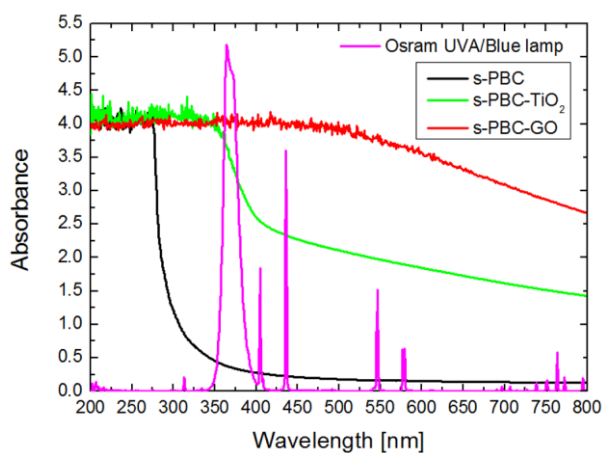
**Figure S2.C** - SEM image of the cross section of the Kraton-TiO<sub>2</sub> membrane and the corresponding EDX spectrum. The table with the wt% of the element is reported in the inset of the EDX spectrum. The elemental maps are also reported on the bottom of the figure. Ti is dispersed in the entire section of the polymeric matrix with some agglomerates.

Raman shift [cm <sup>-1</sup> ]	Peak assignment
619	Aromatic ring deformation
641	$\delta(\text{SO}_2)$ of sulfone, sulfonate, and sulfonic acid
692	Skeletal stretch of <i>t</i> -butyl phenyl group
797	$\nu(\text{CS})$ and vibrational mode of phenyl group
1001	Aromatic ring $\nu(\text{CC})$
1031	$\nu_s(\text{SO}_3^-)$ of sulfonate ion and polystyrene
1110	<i>p</i> -substituted of aromatic ring
1127	$\nu_{\text{as}}(\text{SO}_3^-)$
1155	CC stretch
1198	Aromatic ring vibration

**Table SA** – Assignment of the Raman peaks to the vibrational mode as reported in ref 26 [Fan, Y.; Cornelius, C. J. Raman Spectroscopic and Gas Transport Study of a Pentablock Ionomer Complexed with Metal Ions and Its Relationship to Physical Properties. J. Mater. Sci. 2013, 48 (3), 1153–1161].



**Figure S3** - Uv-Visible absorbance spectra of MB solution with time in dark (top graphs) and under irradiation (bottom graphs) in the presence of s-PBC, s-PBC-TiO<sub>2</sub> and s-PBC-GO membranes. The number in the labels are referred to the time of the process of adsorption or irradiation.



**Figure S4** – Absorbance of the s-PBC (black curve), s-PBC-TiO<sub>2</sub> (green curve), s-PBC-GO (red curve). The spectral irradiance in arbitrary unit of the Osram UVA/blue lamp s reported in the graph (magenta curve).