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Impact of the spatial distribution of sulfate species on the activities of $\text{SO}_4^{2-}/\text{TiO}_2$ photocatalysts for the degradation of organic pollutants in reverse osmosis concentrate

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Highlights

- Internally sulfated TiO_2 photocatalysts were synthesized
- Different sulfate species at the catalyst surface were determined
- Spatial distribution of sulfate species was elucidated
- Correlation between activity and spatial sulfate distribution was established
- Sulfate species at surface improved catalytic activity while those in bulk hindered it

Abstract

Sulfate ions bonded to titanium ions on the surface of internally sulfated TiO_2 greatly improved its photocatalytic activity for the degradation of organic pollutants in reverse osmosis concentrate (ROC). The catalysts were characterized with XRD, BET, SEM, FTIR, EDS, UV-Vis DRS, ICP/MS, XPS and Mott-Schottky plots etc. For the activity difference of sulfated TiO_2 (S-TO) catalysts,

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