



Ti-salt flocculation for dissolved organic matter removal in seawater

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ABSTRACT

In this study, the removal of different fractions of organic matter in seawater was investigated using titanium tetrachloride (TiCl_4) flocculation and compared with ferric chloride (FeCl_3) flocculation. The organic matter fractions were characterised using liquid chromatography–organic carbon detector (LC–OCD). Results showed the hydrophobic compounds removal was dominant by both flocculants. However, the removal of hydrophilic organic compounds, such as humics and low-molecular weight neutral compounds of seawater, was superior by TiCl_4 flocculation compared to FeCl_3 flocculation and this removal increased considerably with the increase of TiCl_4 doses. The flocculated sludge after TiCl_4 flocculation was incinerated to produce titanium dioxide (TiO_2) nanoparticle. TiO_2 from seawater sludge characterised by X-ray diffraction (XRD) and scanning electron microscope/energy-dispersive X-ray spectroscopy (SEM/EDS) showed predominant anatase phase with Si as a main dopant.

Keywords: Seawater; Flocculation; Titanium tetrachloride (TiCl_4); Ferric chloride (FeCl_3); Titanium dioxide (TiO_2) nanoparticle

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