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Fractionation and Characterization of Dissolved Organic Matter (DOM) in Refinery Wastewater by Revised Phase Retention and Ion-exchange Adsorption Solid Phase Extraction Followed by ESI FT-ICR MS

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Abstract

Although the progress of high resolution mass spectrometry in the past decade has enabled the molecular characterization of dissolved organic matter (DOM) in water as a whole, fractionation of DOM is necessary for a comprehensive characterization due to its super-complex nature. Here we proposed a method for the fractionation of DOM in a wastewater based on solubility and acidic-basic properties. Solid phase extraction (SPE) cartridges with reversed phase retention and ion-exchange adsorption capacities, namely MAX and MCX, were used in succession to fractionate a petroleum refinery wastewater into four fractions: hydrophobic acid (HOA), hydrophobic neutral (HON), hydrophobic base (HOB), and hydrophilic substance (HIS) fractions. According to the total organic carbon (TOC) analysis, 72.6% (in term of TOC) of