

## **Fluorescence spectroscopy as a specific tool for the interaction study of two surfactants with natural and synthetic organic compounds**

Aude-Valérie Jung (1), Céline Frochot (2), and Jean-Luc Bersillon (3)

(1) Ecole des Métiers de l'Environnement (EME), BRUZ, France (audevaleriejung@ecole-eme.fr), (2) Laboratoire Réactions et Génie des procédés (LRGP), UMR 7274, CNRS, Université de Lorraine, 1, rue Grandville BP 2045154001 Nancy, France (celine.frochot@univ-lorraine.fr), (3) Laboratoire Interdisciplinaire des Environnements Continentaux (LIEC), CNRS UMR 7360 UFR SciFA, Université de Lorraine, Site Charmois, 15 avenue du Charmois, 54500 Vandoeuvre les Nancy, France(jlbersillon@orange.fr)

Four different techniques were used to study the binding of cationic cetyltrimethylammonium bromide (CTAB) and non-ionic nonylphenylethoxyl (NPE) surfactants to three synthetic organic components that mimic humic-like aggregates and to two natural aggregated humic substances (HS) extracted from aquatic suspended matter. The composition of synthetic organic components were chosen to be similar to high molecular weight highly processed terrigenous HS and low and high molecular weight less processed terrigenous (or aquatic terrigenous) HS. The natural HS were extracted under two different meteorological conditions (rainy and dry periods). No significant interaction between the non-ionic surfactant and any of the studied compounds was found. Concerning CTAB; pH, conductivity and turbidity measurements, along with fluorescence spectroscopy were combined to provide a better understanding of interactions between organic aggregates and the surfactant. The spectroscopic data show that a "highly processed terrigenous HS" fluorophore interacts in a different way with the cationic surfactant than an "aquatic terrigenous (or less processed terrigenous) HS" fluorophore does. Under similar conditions, some spectral changes in the fluorescence signal are correlated to changes in non-specific physical-chemical parameters (pH, turbidity, conductivity) for the organic compounds tested. The complexation mechanism is essentially governed by charge neutralization, which can be monitored specifically by the fluorescence of the organic moieties.