

Potentials of buffers and chelators for quantitatively robust observation of excitation-emission matrix

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Keywords: excitation-emission matrix, metals, natural organic matters, pH

Abstract

Excitation-emission matrix (EEM) is known as an efficient indicative characteristics of natural organic matters for their compositional classification related to functional group moieties. Owing to the simple measurement process and small required sample volume, EEM has been used for various kinds of waters such as soil leachates, groundwater, river water, lake water, seawater, and wastewater especially when people needed to observe the characteristics of organic matters in short intervals and from wide areas. Although EEM can be used as an efficient parameter, it is known that EEM can be affected by pH and metals which co-exist in the sample solution. Because of this effect, researchers need to be careful of such conditions when they conduct quantitative comparison with previously reported EEM data and when they newly analyze their samples. In this study, the ideas of techniques to control pH and to correct the metal coordination effect on EEM are suggested by employing buffers and metal chelators. The first goal of this technique is to obtain EEM data robust for the quantitative comparison. Secondary, it is efficient if people can develop the methods which are easy in handling and applicable to wide range of environmental samples. The difficulties and feasibilities with the development of such methods are discussed by theoretical calculations and experimental observations. Our observations showed prospective feasibility for the development of the technique for river water. On the other hand, it was revealed that reaction time and interference of buffers and chelators need to be further examined especially for the application on soil leachates and seawater.