

# A STUDY OF METAL ION ATTACHMENT TO NON-IONIC SURFACTANTS BY ELECTROSPRAY IONIZATION MASS SPECTROMETRY

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## Introduction:

The attachment of divalent transition metal ions to non-ionic surfactants is being investigated by high resolution electrospray ionization ion cyclotron resonance mass spectrometry (ESI-FTICR-MS). The mode of attachment and the binding strengths of a series of metal ions, including Zn(II), Co(II) and Cd(II) are being investigated as a function of solvent and counterion. The metal-surfactant interactions are compared with standard polyethyleneglycol and crown ether systems which act as linear and cyclic models for the ethyleneoxide components of the surfactants.

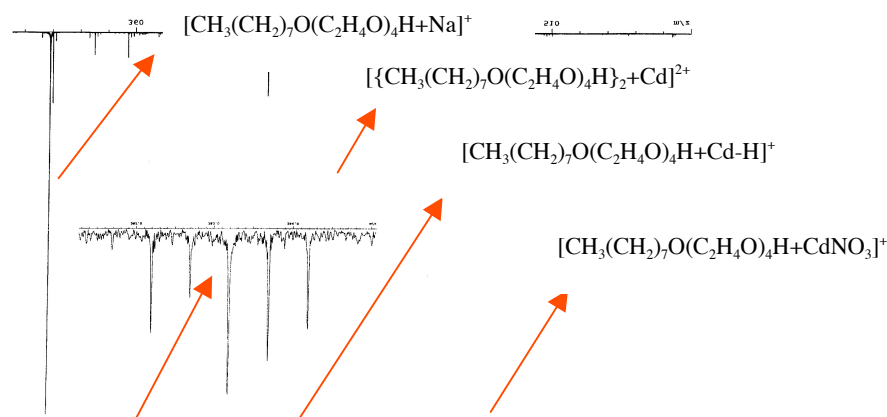


Figure 1 Positive-ion spectrum of Tetraethyleneglycol mono-octyl ether binding Cd(II).

## Experimental:

All experiments were performed on a 7 T Bruker Bio Apex II Fourier transform ion cyclotron resonance mass spectrometer with an electro spray ionization source. The metal salts and surfactants were mixed and dissolved in 90% methanol: water. This solution was injected into the source by a syringe pump at a flow rate of 90  $\mu$ l/min.

## Results and discussions:

- ❖ Positive-ion mass spectra show the reaction of the divalent metal ions with the surfactant oligomers to form doubly and singly charged species.
- ❖ The same molecular ion forms were observed for three different surfactants with metal nitrates,  $[\text{oligomer}+\text{Cd}-\text{H}]^+$ ,  $[\text{oligomer}+\text{CdNO}_3]^+$  and  $[\text{oligomer}+\text{Cd}]^{2+}$
- ❖ Competitive binding experiments and collision induced dissociation is being used to investigate the metal-surfactant interaction.