Mass Media

JEOL *Mass Spectrometry News* *October 1999*

LCmate Goes to Eastern Analytical Symposium

The JEOL *LCmate* benchtop high-resolution LC/MS system will be on display from November 15-18, 1999 at the Eastern Analytical Symposium to be held at the Garden State Convention and Exhibit Center in Somerset, NJ. If you are attending EAS, please come visit us at the JEOL booth and take a look at the *LCmate*.

Bile Acid Glucuronide Analysis with JEOL LCmate

Professor J. Goto's research group at Tohoku University recently published a method for the separation and analysis of bile acid 24-glucuronides in human urine by using liquid chromatography and negative-ion electrospray ionization with the *LCmate*[1]. The article describes sample extraction and separation methods, qualitative analysis and quantitative analysis by using an ^{18}O-labelled internal standard. Detection limits of 10 femtomoles were readily achieved with good linearity of response for both low-resolution and high-resolution selected ion monitoring.

Isomer Discrimination with JEOL Electron Monochromator

JEOL USA, Inc. has installed a trochoidal electron monochromator on the *AX505* mass spectrometer, based on the work done in collaboration with J. Laramee and M. Deinzer at Oregon State University[2]. The electron monochromator provides an ionizing electron beam with a well-defined adjustable electron energy in the range 0 to approximately 40 electron volts. This electron source can be used for both positive-ion and negative-ion applications, and was recently applied to the identification of spore-forming bacteria[3].

The energies for the formation of specific negative ions are dependent on the structure of the neutral molecule. In collaboration with Prof. K. Voorhees at Colorado School of Mines, we have been investigating the use of the electron monochromator for the identification of nitro- polynuclear aromatic hydrocarbons and isomeric nitroaromatics. A very clear example of the use of the monochromator to distinguish isomers is nicely illustrated by the three nitrotoluenes. Figure 1 shows the relative abundance of the $NO2^-$ ion as a function of electron energy. The effect of resonance stabilization is clearly evident in the relative abundance of the lower-energy resonance for each isomer.

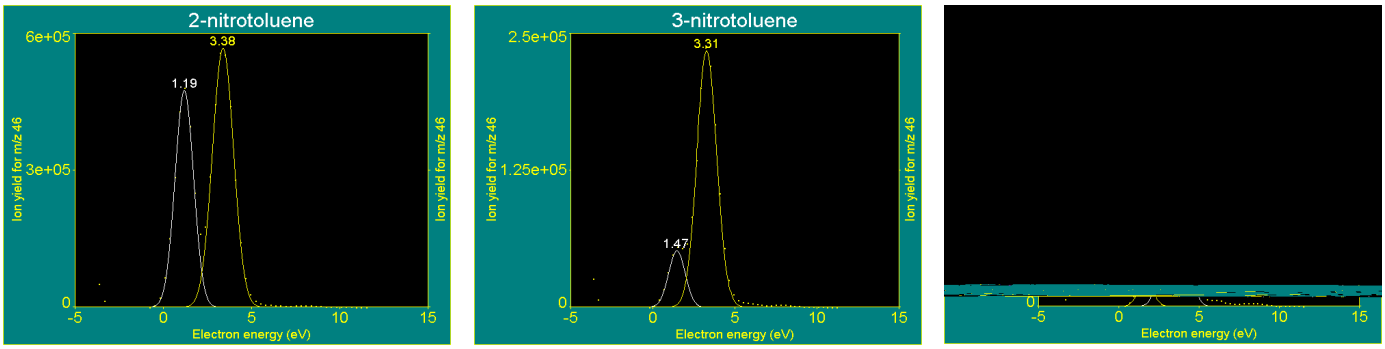

Figure 1. Electron-capture resonances for $NO2^-$ formed from isomeric nitrotoluenes.

New High-Sensitivity Electron Ionization Source for *MStation*

An improved electron ionization source (EI-15D) has been developed for the MStation mass spectrometer. The new ion source provides better detection limits through higher ionizing electron current and better transfer of the GC effluent into the mass spectrometer ion source. An example of the use of the EI-15D for dioxin analysis is shown in Figure 2. This ion source is only available for the *MStation* mass spectrometer.

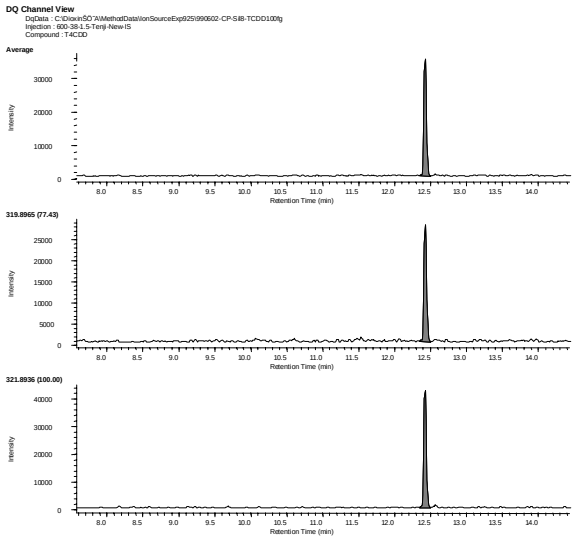

Figure 2. HRSIM chromatograms for 100 fg 2,3,7,8-tetrachlorodibenzodioxin measured at a resolving power of 10,000 (10% valley definition) using the EI-15D ion source. The S/N ratio is better than 150:1. Average (top trace), m/z 319.8965 (middle trace) and 321.8936 (bottom trace)

References

1. Ikegawa, S.; Okuyama, H.; Oohashi, J.; Murao, N.; Goto, J. *Analytical Sciences*, **1999**,*15*, 625-631.
2.

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