Mass Spectrometry Facility

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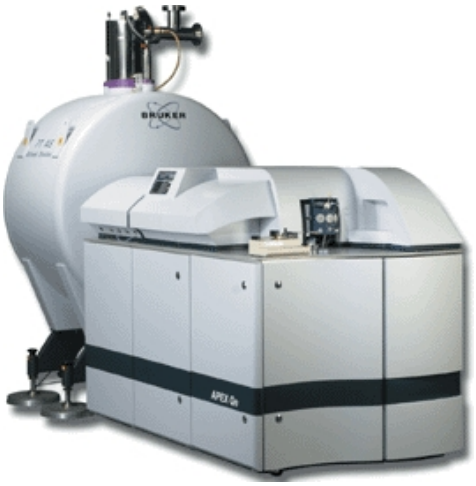
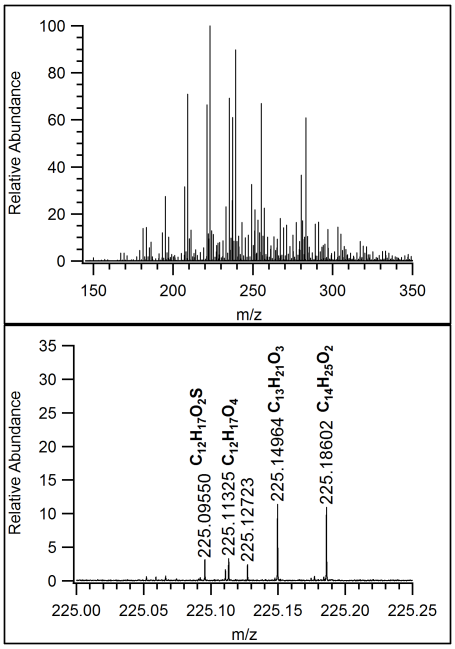
R & D Capabilities: The Mass Spectrometry Facility in the Department of Chemistry is equipped with eleven mass spectrometers. The facility has a long history serving the needs of the Department of Chemistry, other departments on campus, other universities across North America and many local as well as national companies. Industries include pharmaceutical, synthetic chemical, chemical supply, petroleum and petrochemical. Users of our facility look to us to assist them with their analytical and troubleshooting needs.

Techniques and instrumentation: For all of the available instrumentation in the facility please see http://www.chem.ualberta.ca/~massspec/instr.htm. These instruments allow the facility to provide service in GCMS, GCMS/MS, LCMS, LCMS/MS, electrospray, atmospheric pressure chemical ionisation, atmospheric pressure photo-ionisation, and matrix-assisted laser desorption / ionisation (MALDI). The wide range of techniques available for analysis allows us to provide service for a wide range of sample types including complex mixtures.



As an example the Fourier-transform ion cyclotron resonance mass spectrometer (shown on the left) provides ultra-high resolving power allowing the analysis of complex mixtures. Shown here is a spectrum of the acid extractables from an oil-sands process water (OSPW) sample. Using electrospray as the ion source, the top spectrum shows the overall negative ion spectrum for the sample. The bottom spectrum below shows a zoom-in for the region around m/z 225. The peaks shown correspond to the $(M-H)^-$ ions for compounds in the mixture. Note the ability of the mass spectrometer to distinguish the degree of oxidation of this OSPW sample and assign the elemental composition of the peaks.



Exact mass LCMS analysis is offered on our oaTOF instrument. This service is particularly useful for identifying modifications to known compounds as well as determining the elemental composition of unknown compounds. Compounds not amenable to LCMS can be analysed by either GCMS if sufficiently volatile or by MALDI for compounds of low volatility.