[TECHNOLOGY BRIEF]

Using the Waters Atmospheric Solids Analysis Probe (ASAP) in a Walk-Up Environment

GOAL

To demonstrate the feasibility of the Atmospheric Solids Analysis Probe (ASAP) in a walk-up environment, organic synthesis reactions were monitored.

BACKGROUND

In organic synthesis labs, reactions are often monitored by thin layer chromatography (TLC), which requires mobile phase optimization. Developing a TLC plate can be a time-consuming process, whereas all chemists need to accomplish is to monitor when the disappearance of the starting materials and the appearance of the final product.

To increase the efficiency of the analysis of these reactions, an open access ASAP system was introduced. With minimal training, chemists were able to analyze their own samples while the analytical chemists concentrated on more difficult compounds.

Without reaction workup or sample preparation, in less than one minute, molecular weight information can be obtained and informed decisions made without delay.

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Figure 1. The sample is loaded directly onto the tip of a glass capillary. The sample is then directly inserted into the ionization source chamber. Bulk MS data are collected in seconds.

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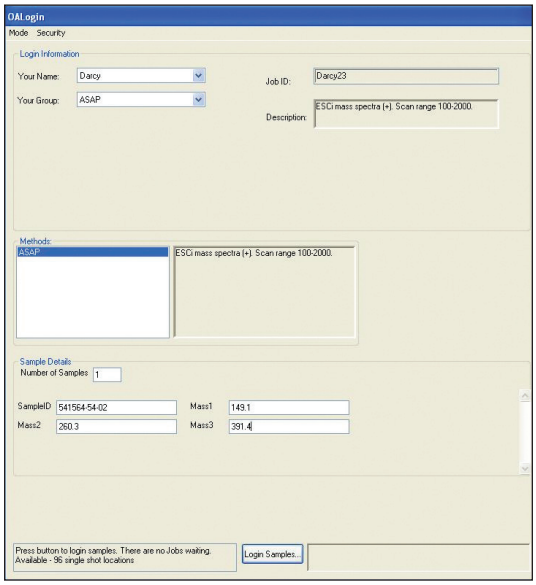

Figure 2. Single page OALogin window. After inserting probe into MS, users simply pick their name, choose an appropriate method, fill out details, and click Finish.

THE SOLUTION

ASAP coupled to an ACQUITY® SQD was used for the analyses. The sampling procedure is shown in Figure 1. First, the sample was loaded onto the sealed glass melting point capillary tube of the ASAP probe by dipping the tip into the sample. The sample information was then entered into the OALogin software (Figure 2), which is a tool with MassLynx™ Software's OpenLynx™ Open Access Application Manager.

During the login procedure, a user is asked to enter in a minimal amount of data. On a single page, the user enters their name and chooses an appropriate method from a predefined list. They then enter sample information, place the probe in the outer assembly, and hit OK.

Once the ASAP probe was inserted into the sealed MS source enclosure, the desolvation gas was rapidly heated to 400 °C for MS acquisition. MS full scan data from 60 to 2000 amu was acquired for 0.5 min using a 0.2 sec scan duration. Target masses were extracted from the full scan data for reporting. The target masses were for the precursors and the final product.

The report was emailed to the user as a pdf (Figure 3). The report contained a simple table showing whether each target mass was found or not, as well as a spectra showing the found masses. The pdf format aided in copying the results to an electronic lab notebook. This facilitated viewing and sharing of the information.

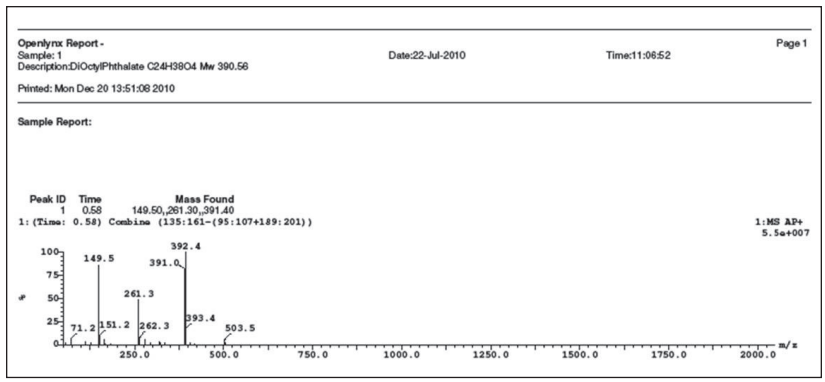

Figure 3. ASAP report emailed to user as a pdf upon completion of analysis. This report simply shows the spectra of the sample.

SUMMARY

The ASAP probe can be used in conjunction with a quadrupole mass spectrometer to examine starting materials and monitoring the progress of reactions. Without reaction workup or sample preparation, in less than one minute, sample information can be obtained and informed decisions made without delay. Pairing ASAP with OALogin further simplifies the process and enables anyone to use the system.

As a result, the organic synthesis workflow efficiency is greatly enhanced, saving time and reducing the cost of analysis.

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