

# Real-time science solutions

## Vapur™ API Interface

Ambient pressure desorption ionization has been implemented on a wide variety of LC/MS instruments. We have designed and implemented the Vapur atmospheric pressure interface to improve collection of ions desorbed from the surface by collimating them for transfer into the MS. The Vapur has significantly improved performance of our Direct Analysis in Real Time (DART®) desorption ionization sources.

The DART® source utilizes inert carrier gas containing either metastable atoms or molecules to ionize molecules present in close proximity to the exit of the DART gun. The flow of this carrier gas is perturbed as it strikes the surface. Due to vacuum restrictions, most LC/MS instruments collect only a small fraction of this carrier gas. We designed Vapur to collect more of the desorption gas containing ions and transfer it to the API inlet region where the ions can enter the mass spectrometer.

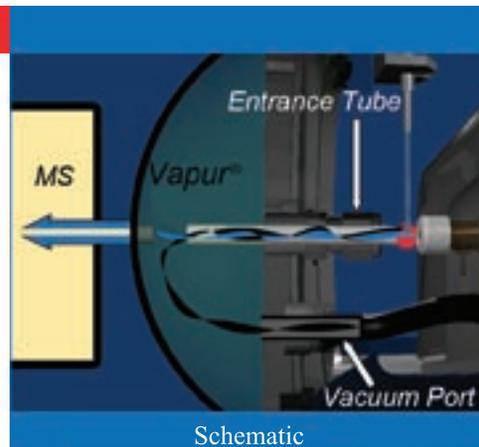
In the Vapur (see schematic), a relatively large open tube, the entrance tube, was placed between the desorption ionization region and the API-inlet of the LC/MS. The outlet of this tube is placed in close proximity to the API-inlet. A small gap was provided between the entrance tube and API-inlet so that suction from a low capacity vacuum pump could be

used to evacuate the region. A picture of the Vapur as deployed on a Thermo LCQ™ is shown in figure 2.

The function of the pump is to suction more of the gas containing ions and molecules desorbed from the sample into closer proximity to the instrument API inlet. The pumping strips away the carrier gas so that the pressure of the mass spectrometer can be kept in its normal operating range. The Vapur also collects ions and carrier gas while reducing the volume of oxygen present in the atmosphere around the sample, reducing the loss of ions that might otherwise interact with oxygen, becoming neutrals.

In practice, the Vapur has improved the quantitative capability of the DART ionization system. Evidence of this is shown in figure 3, where the repeat injection of a solution containing the drug compound Verapamil is used to demonstrate the reproducibility of sampling. In this case, the AutoDART-96, our automated sample positioning system was used to reliably present an aliquot of sample to the DART source ionization region.

Vapur is available on a wide variety of commercial LC/MS systems, including instruments from JEOL, Thermo, ABI, Agilent, Bruker and Waters.



Schematic



Figure 1 - Liquid Sampling



Figure 2 - Vapur on the Thermo LCQ

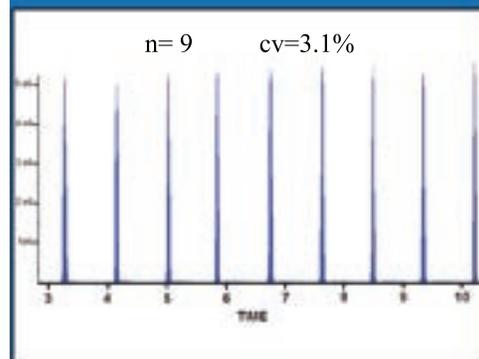


Figure 3 - Verapamil Quantitation