Application Note

AutoChem and Mass Spectrometer
Gas Calibration

The AutoChem TCD level calibration is a powerful tool for converting raw TCD signals to gas concentrations. This built-in calibration provides the AutoChem with known gas concentrations and records the TCD signal associated with each one. The concentration and signal data are then used to generate a polynomial for converting TCD signals to gas concentrations.

This capability can also be used to generate a gas calibration for a mass spectrometer. A concentration calibration for hydrogen was generated to demonstrate this technique. During the AutoChem TCD level calibration, a Pfeiffer ThermoStar (QMS 200) was used to monitor the hydrogen concentration in the gas stream. Typical calibration data are shown in Figure 1. The AutoChem was configured with argon as the carrier gas and 10% hydrogen in argon as the loop gas. The built-in TCD level calibration automatically generated 11 gas concentrations using an internal blender.

The AutoChem and the Pfeiffer ThermoStar recorded similar signal profiles for the level calibration. The Pfeiffer ThermoStar data can be exported to an ASCII file, and used to generate a calibration curve. Several commercial software packages (Microsoft Excel, Microcal Origin, and Matlab from Mathworks)
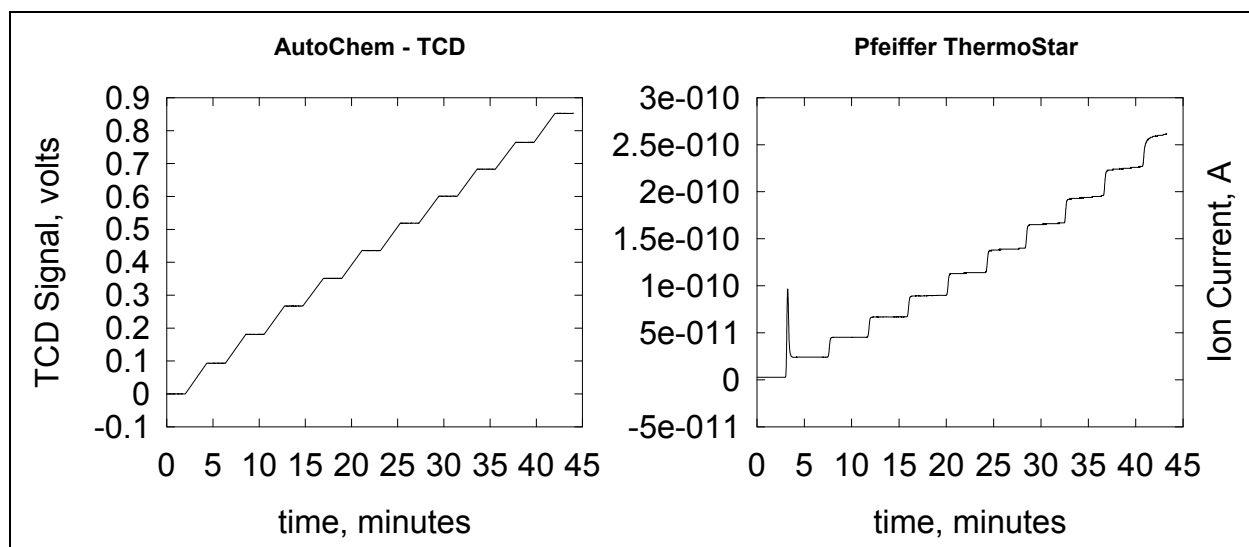

Figure 1. *Hydrogen calibration using Micromeritics' AutoChem and the Pfeiffer ThermoStar mass spectrometer.*

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are suitable for generating the final calibration curve, Figure 2. The calculated polynomial for the hydrogen gas concentration can be used to convert ThermoStar Ion Current (mass = 2) to hydrogen concentrations. Most commercial mass spectrometers can be used with the AutoChem to generate calibration curves for the mass spectrometer.
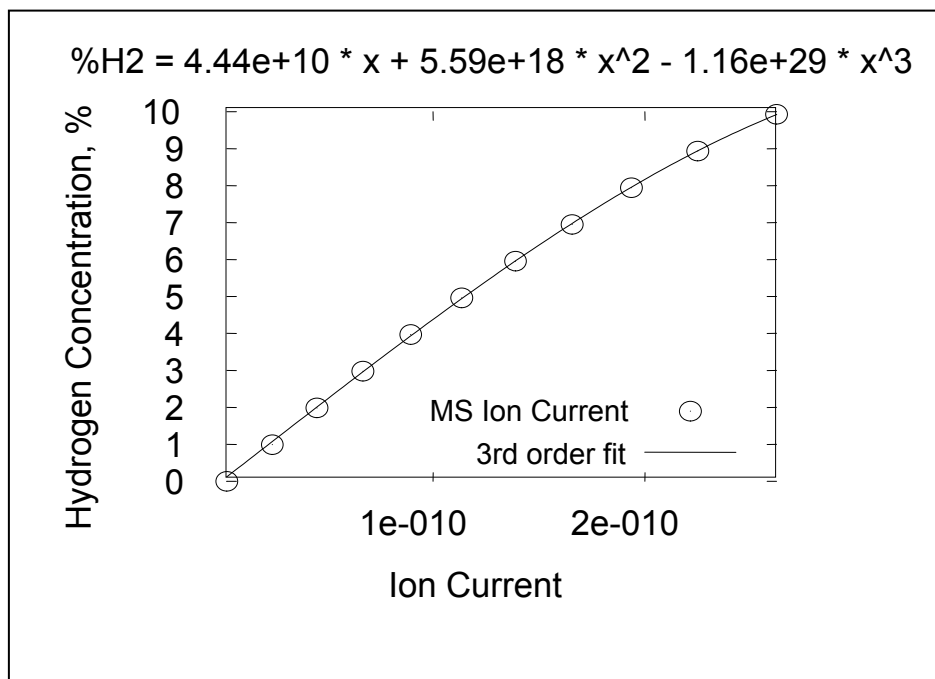

Figure 2. *ASCII data from the mass spectrometer were used to generate the final calibration curve.*