

Gas Analysis | HPR-20 TMS
Application Note AN-10008.1

Fast Response

Transient MS for fast event studies



HPR-20 TMS Transient MS

Transient MS

For fast event studies at atmospheric pressure Hiden produce the HPR-20 Transient MS system. The system is based on the research grade HPR-20 gas analyser. Features of the system to optimize the response for fast event studies include:

- Pulse Ion counting detector (PIC) – 7 decades continuous log scale
- 1m capillary – less than 150 ms response time from capillary sampling point to detection
- Open ion source – increases pumping speed on ion source

These features together with a standard scan speed of greater than 500 data points per second combine to give the fastest response gas analysis system of its type on the market.

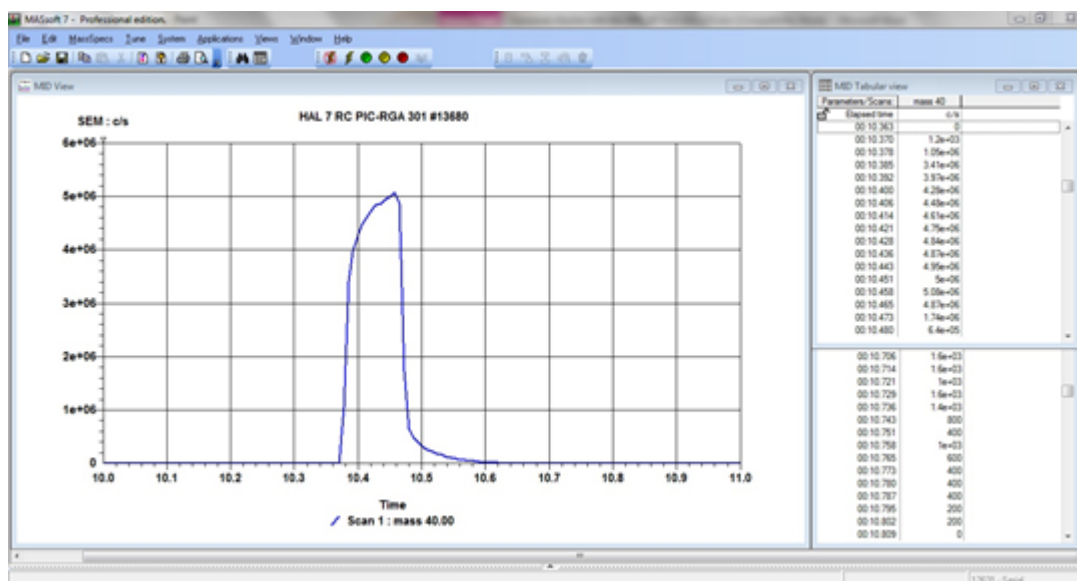


Figure 1: Transient MS Data > 5 decades response in < 0.2 seconds - Time is shown in seconds. Tabular data elapsed time is shown in minutes:seconds:milliseconds for clarity

Experimental Set-up

To test the response time of the HPR-20 TMS Transient Mass Spectrometer system the sampling capillary was connected to the outlet of a 2 position microelectric actuated Valco valve. This allowed pulses of 500 μ L of Argon to be injected into a Helium carrier gas stream. The experimental setup is shown in Figure 2.



Figure 2 Capillary attached to outlet of valve

The resulting data from this experiment is shown in Figure 1. The main plot shows 1 second of data with one data point every 7 milliseconds. Here we can see the signal intensity changing from 0 c/s to over 1×10^6 c/s in 15 ms. The signal then returns to 0 c/s in less than 350 ms. The tabular data shows the exact timings. The whole process is completed in less than 500 ms. The inset in Figure 1 shows a similar experiment and demonstrates a 5 decade response in around 50 ms. Total time shown in this plot is 200 ms.

Conclusion

The data shows that the HPR-20 TMS Transient Mass Spectrometer is capable of measuring very fast changes in gas concentration over concentration ranges from 0 to 100% levels.

Results