

# Reproducible, accurate and precise measurement of collision cross sections

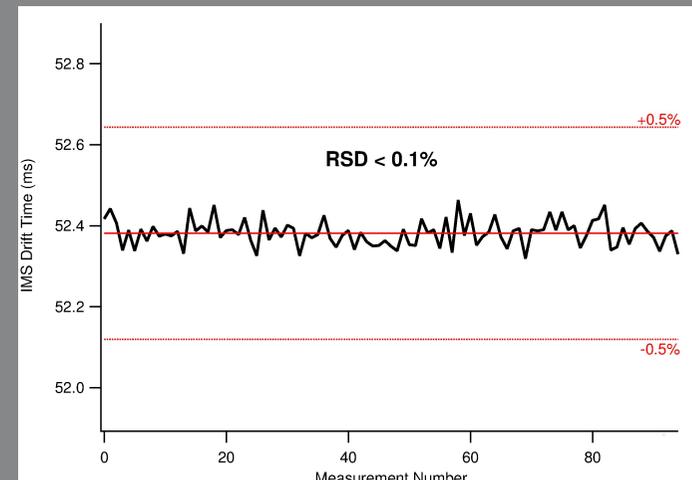
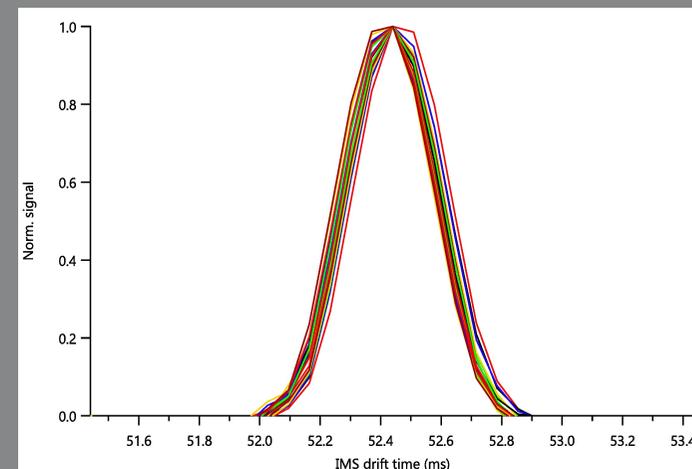
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Ion mobility measurements are used to derive collision cross sections (CCS) of ions. These CCS are starting to be commonly used as additional molecular identifiers in combination with accurate mass, fragmentation pattern and LC retention time. In contrast to retention times, CCS are molecular properties that can be derived from first principles and therefore more robust and free from matrix interference. Yet, CCS are only useful if they can be determined accurately, precisely and reproducibly.

In order to determine accurate and precise ion mobility drift times and therefore CCS, the use of high resolution drift-tube IMS-MS has clear advantages over low resolution drift-tube or travelling wave instruments. The high IMS resolution enhances accuracy through exact determination of peak positions, whereas the drift-tube design provides the unique capability to directly calculate the CCS from ion mobility drift times. Note that this direct calculation only results in precise values under low-field ion mobility conditions ( $< 2$  Td) - the TOFWERK IMS-TOF is the only commercial instrument fulfilling these criteria. Additionally, only the TOFWERK IMS-TOF allows precise control of all relevant variables such as IMS potential, pressure and temperature.

**The TOFWERK IMS-TOF enables reproducible determination of accurate and precise drift times and collision cross sections with RSD  $< 0.1$  %.**



The pressure and temperature-controlled IMS cell of the TOFWERK IMS-TOF ensures highly reproducible measurements. Top: Overlay of 20 independently recorded ion mobility spectra for a tetraalkylammonium salt demonstrating outstanding reproducibility. Bottom: Evaluation of drift-time stability of 100 injections of a tetraalkylammonium salt show RSD values of  $< 0.1\%$ . The solid red line indicates the average drift-time whereas the dotted red lines indicate  $\pm 0.5\%$  deviation from the average. Nitrogen was used as drift gas, pressure was set to 1000 mbar and temperature to  $60^\circ\text{C}$ .

IMS-TOF

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