

Overview:

○ The MT Explorer 30 (MTE 30) is a compact ion trap tandem mass spectrometer suitable for both lab-based workflows and field deployment. It enables rapid, sensitive, and accurate identification of trace analytes for applications spanning forensic science, pharmaceuticals, and materials research.

○ This study demonstrates the successful detection of 4,4'-difluorobenzophenone at 100 µg/mL using a small-footprint ion trap mass spectrometer. ESI-MS/MS was employed for confirmatory analysis

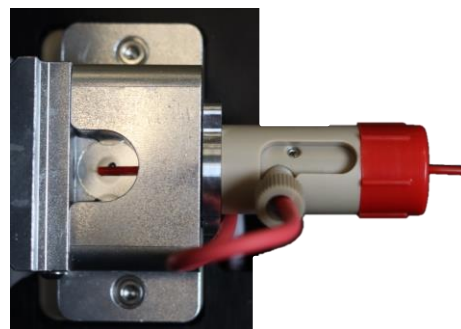
Introduction:

○ 4,4'-difluorobenzophenone is a fine, low-volatility chemical primarily used as a precursor in polymer synthesis, notably for Polyether Ether Ketone (PEEK). This high-performance polymer is critical in applications ranging from medical implants to aerospace components. Additionally, 4,4'-difluorobenzophenone plays a role in pharmaceutical synthesis.

○ As an intermediate in essential products, monitoring 4,4'-difluorobenzophenone during production provides valuable quality control insights. Analysis with a compact ion trap mass spectrometer offers an efficient solution for optimizing synthesis processes across various industries.

Methods:

4,4'-difluorobenzophenone reference standard was diluted in ethanol with 0.1% Formic Acid 10x for a concentration of 100ug/mL. Direct infusion with ESI-MS/MS analysis was performed on MTE 30 in positive ion mode with 1 µL/min.



DSAP-ESI Source and MT Explorer 30 Mass Spectrometer

Results and Discussion:

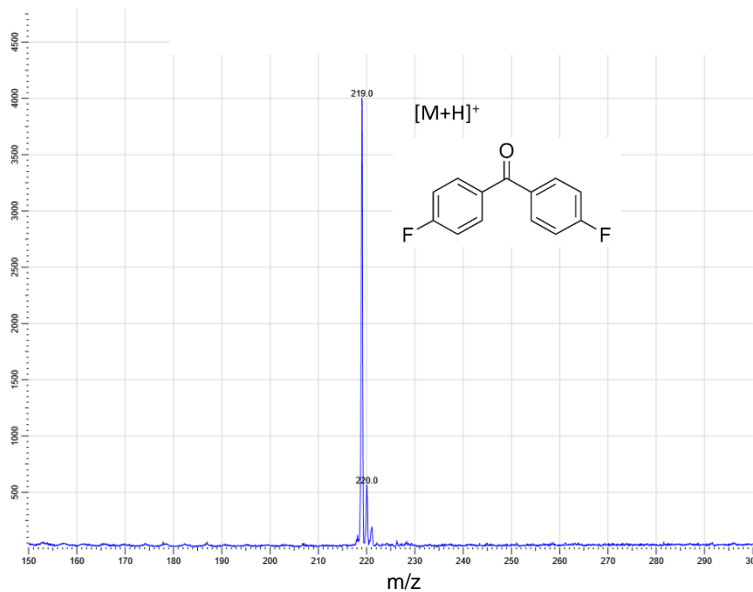


Figure 1 ESI MS/MS isolation of 4,4'-difluorobenzophenone

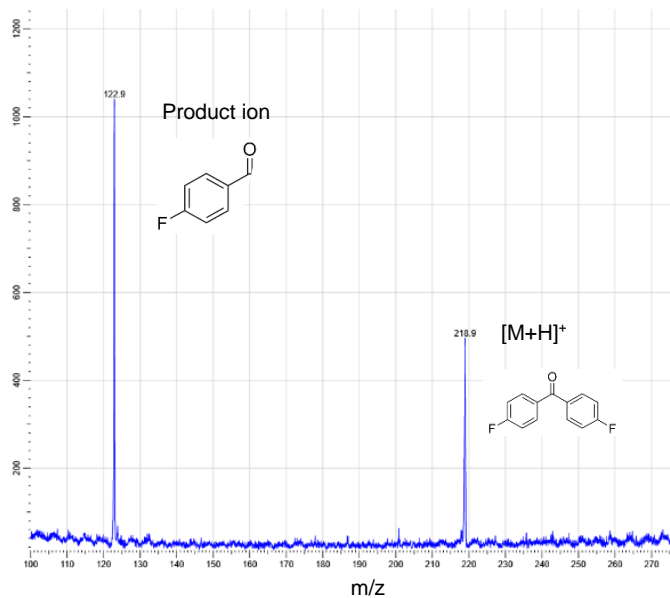


Figure 2 ESI MS/MS fragmentation of 4,4'-difluorobenzophenone with characteristic product ion (structure speculative)

ESI MS/MS fragmentation of 4,4'-difluorobenzophenone yielded the $[M+H]^+$ peak at m/z 219 and the major fragment at m/z 123 with satisfactory signal.

The successful characterization of 4,4'-difluorobenzophenone with minimal sample preparation and short duration spectra accumulation indicates the potential for detection of the chemical at significantly lower concentrations as part of quality control practices or reaction monitoring.