CaptiveSpray nanoBooster™

- The Revolution in Proteomics Ionization

LC-MS Source

Innovation with Integrity

The Key to Performance and Reliability for nano flow MS

Bruker CaptiveSpray principle:

Stable and robust nanoflow LC/MS is still a challenge in proteomics analysis. The Bruker CaptiveSpray source is a revolutionary ion source with a patented design that provides provides easy operation just as simple normal-flow electrospray.

CaptiveSpray delivers nanospray sensitivity, resists plugging, and provides reproducible uninterrupted flow for even the most complex proteomics samples.

Bruker's revolutionary CaptiveSpray source is now available with smart dopant addition option – the nanoBooster

CaptiveSpray nanoBooster brings your MS to the next performance level and provides even higher flexibility.

- Boost nanoflow sensitivity
- Push up ID rates
- Enabling Glycoanalysis
- Supercharging capability

Reliability and Robustness

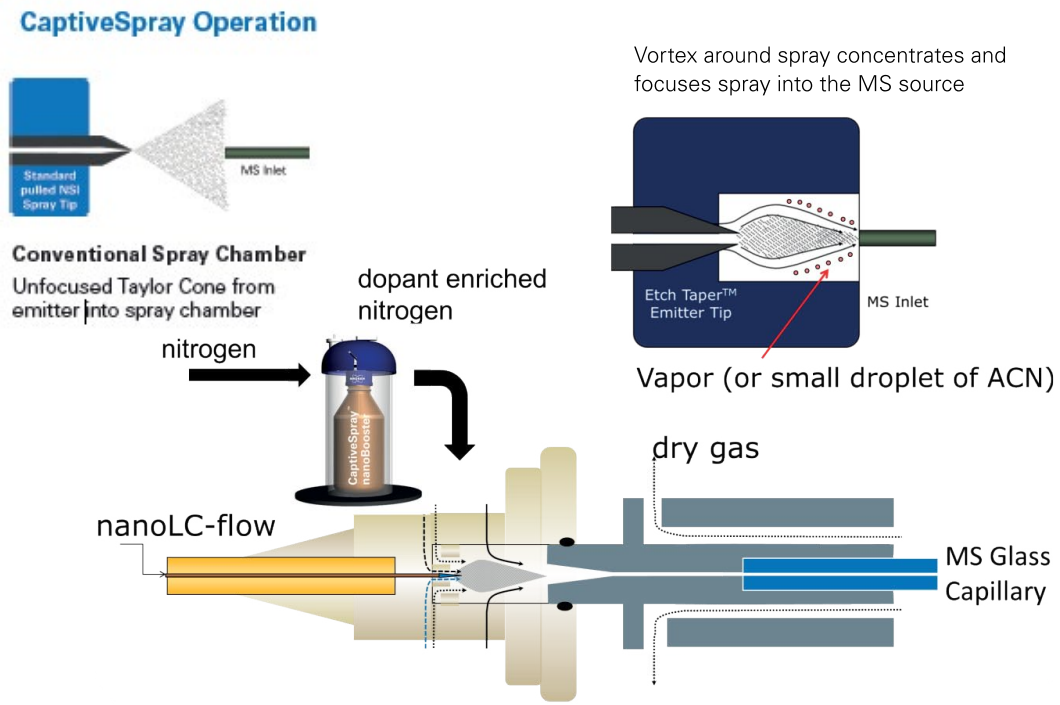
CaptiveSpray is providing nanospray sensitivity with the ease of use and robustness of ESI. The patented Etch Taper™ technology provides a spray tip that is not internally tapered like the tip of a typical pulled nanospray ionization needle.

This results in significantly less clogging of the spray tip allowing more samples to be analyzed with greater confidence.

Ease of use

CaptiveSpray provides a vortex gas that sweeps around the emitter spray tip to desolvate and to focus the Taylor cone into the MS inlet capillary. The vacuum seal to the MS ion guide draws all of the sample ions into the MS increasing the efficiency of sample transfer from the spray tip into the mass spectrometer. The direct connection to the inlet capillary eliminates the need for any source adjustment making the CaptiveSpray source truly Plug-and-Play.

Smart ionization support by dopant enriched gas supply



Smart ionization support by dopant enriched gas supply

The nanoBooster option allows the modification and vapor enrichment of gas which flows around the emitter. Dependent on the used dopant either charge stripping or charge enhancement of peptides and proteins can be achieved during the ionization process.

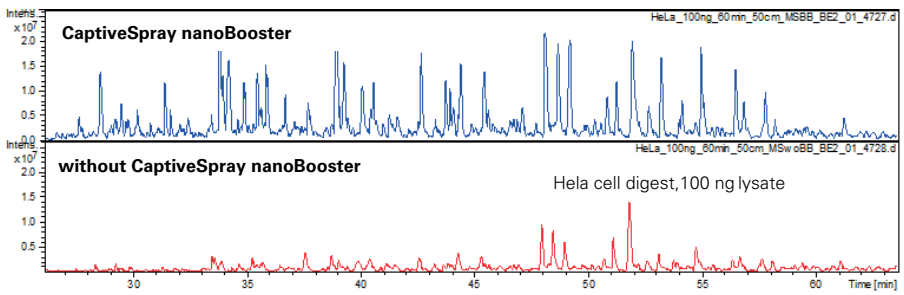
Charge enhancement is advantageous for the analysis of large biomolecules due to the reduction of the mass-to-charge (m/z) ratio. Furthermore higher charge stages increase efficiency of electron transfer dissociation (ETD) MS/MS.

Boost Your ID Rates

CaptiveSpray nanoBooster increases the ionization efficiency of peptides significantly, leading to a much higher sensitivity than even conventional nanospray.

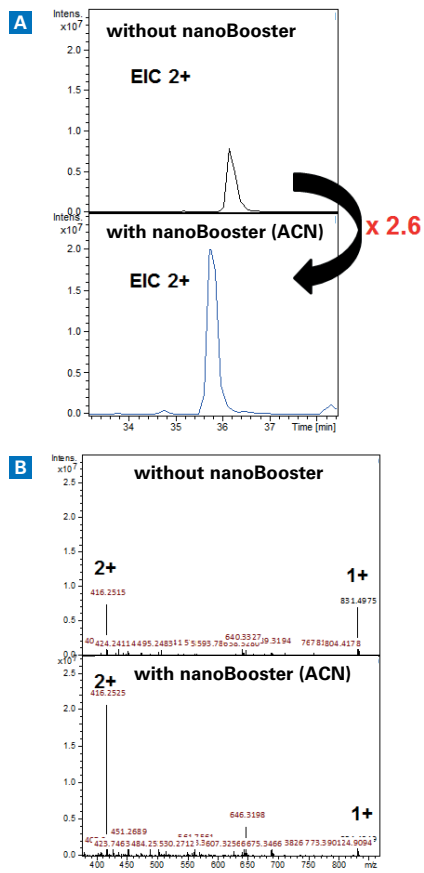
This results in a highly improved number of identified proteins in complex mixtures.

CaptiveSpray nanoBooster

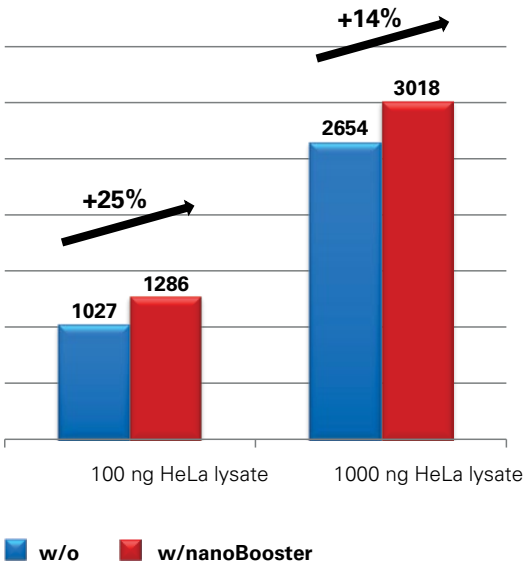


Significant increase in signal intensities for low sample amounts.

Charge enhancement for Proteomics



Number of identified proteins

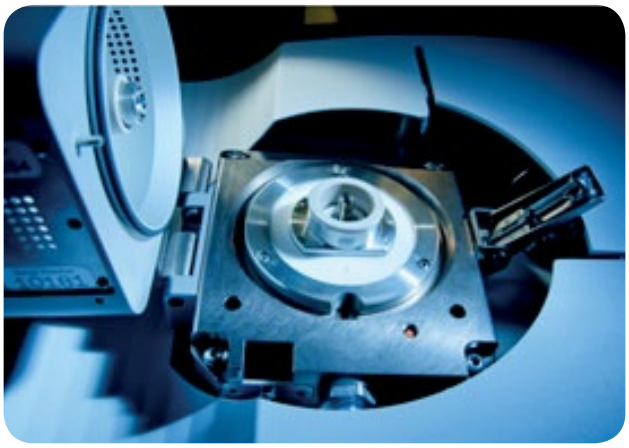


Data measured with impact UHR-TOF prior to HD improvement.

Effect of the nanoBooster. (A) Shown is the increase of signal intensity of m/z 416.25 with nanoBooster. (B) The dopant enrichment (ACN) causes sensitivity gain and emphasises higher charge states at the same time.

Plug - and - Play

The CaptiveSpray source mounts directly onto all current Bruker API mass spectrometers. The Ion Transfer Interface connects directly to the front of the capillary, eliminating the need for complex XYZ adjustable stages.



Flexibility

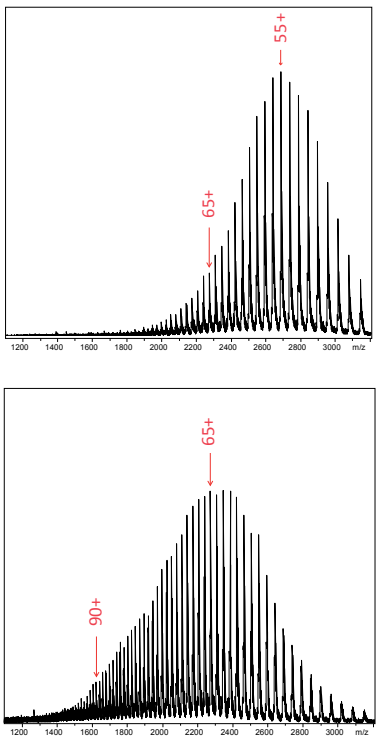
The Bruker CaptiveSpray operates at a wider flow rate range than traditional nanospray. CaptiveSpray delivers stable and reproducible gradient spray from 50 nL/min to 5 uL/min allowing the use of a wide range of column diameters to deliver optimal performance for a dynamic range of experiments.

Supercharging in gas phase

The gas supply is software-controlled. The user can define the dopant enrichment and charge effect.

CaptiveSpray nanoBooster provides the capability of post-column charging of peptides whithout the need to add buffers to the HPLC solvents and thus without influencing the chromatographic performance.

Comparison of charge envelop for an intact mAB



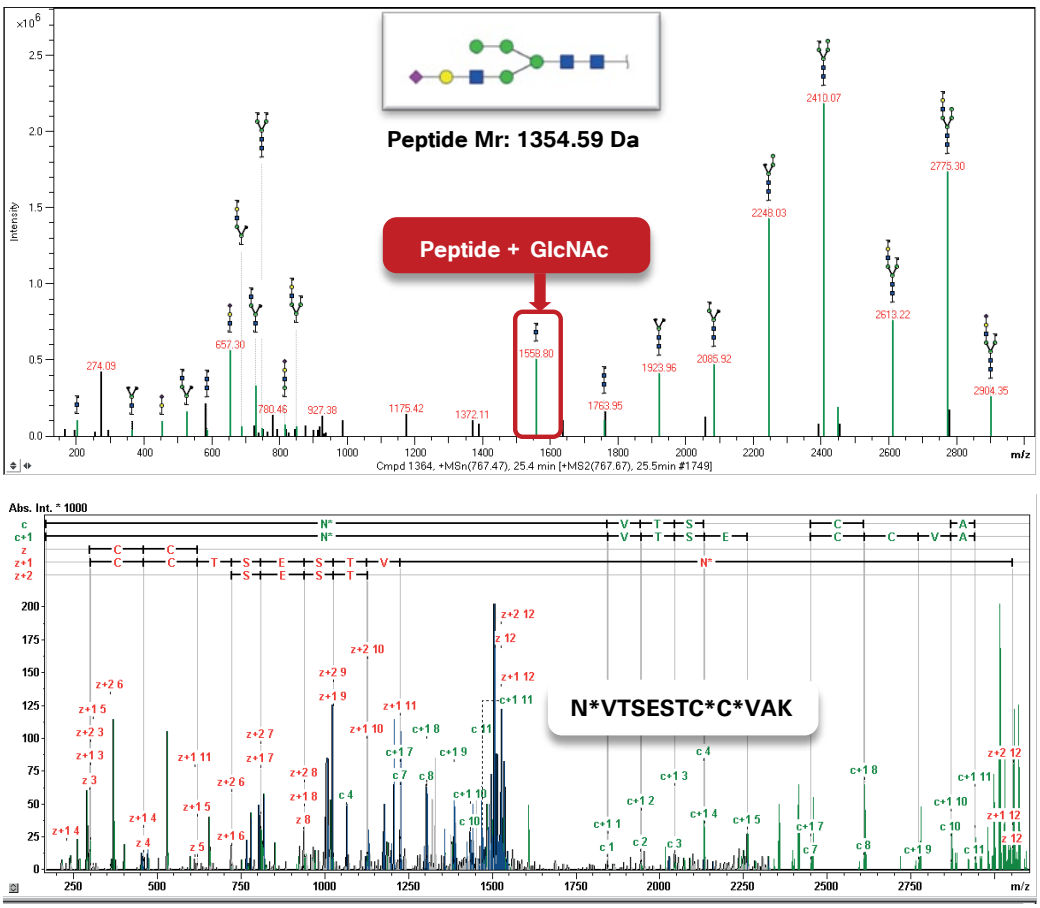
CaptiveSpray nanoBooster allows supercharging without compromising LC separation – mAB = monoclonal antibody.

CaptiveSpray nanoBooster ...

The enrichment of the nanoBooster sheath gas with acetonitrile results in a significant improvement of glycopeptides. The charge state increase provides higher quality ETD spectra and enables highly improved glycopeptide characterization by assignment and identification of the glycosylation sites.

CaptiveSpray nanoBooster allows the detection and identification of low abundant glycopeptides and their glycan structures due to higher quality MS/MS spectra. The combination of CID and ETD reveals full information on glycopeptides: glycan structure, sequence and glycosylation site.

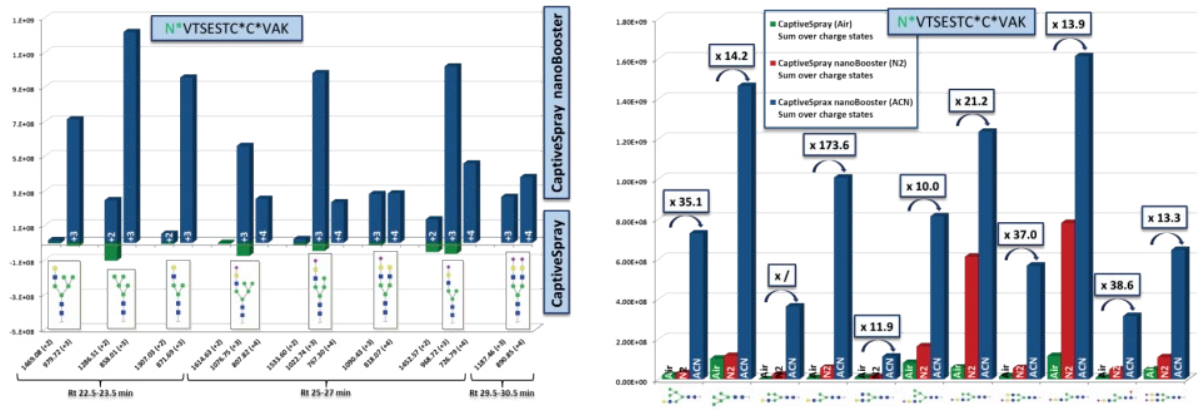
Structure elucidation by combination of CID amd ETD



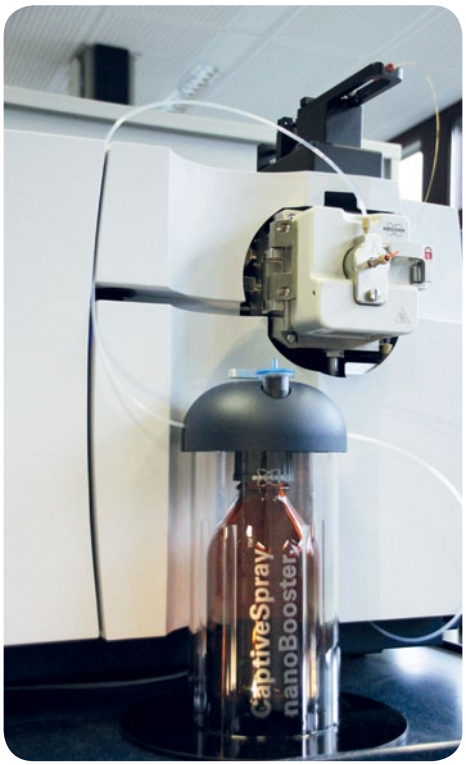
Follicle-stimulating hormone alpha chain: hCGα $[M+4H]^{4+}$=767.47 m/z; Top: (CID) Identification of *N*-glycan structure with GlycoQuest. Bottom: (ETD) Elucidation of *N*-glycopeptide sequence and glycosylation site (N76).

... enables glycopeptides analysis

Ionization and charge effects on *N*-glycopeptides



Charge distribution and intensities of *N*-glycopeptides measured on amaZon speed ETD with CaptiveSpray and nanoBooster.



Bruker – The Proteomics Company

The patented CaptiveSpray nanoBooster perfectly fits to all Bruker ESI MS systems with the common APOLLO II ionization frontend. Together with the Bruker nano-Advance UHPLC you get the perfect nano to cap flow LCMS system for proteomics applications.

A common platform – out of one hand.

CaptiveSpray nanoBooster™

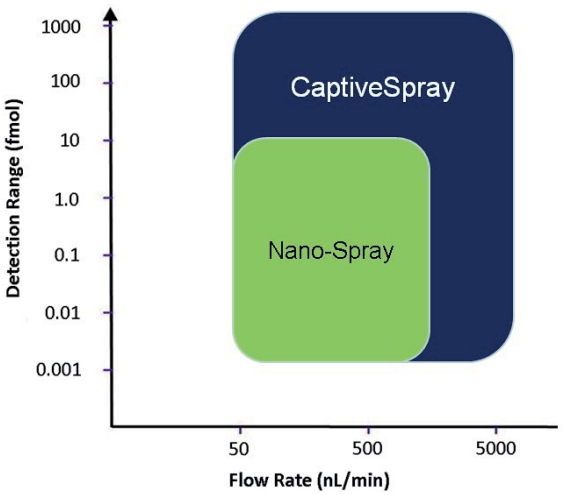
The ability to use larger columns with higher loading capacities provides higher sensitivity and dynamic range than conventional nanospray.

The stable and reproducible nature of the spray makes the CaptiveSpray ideal for quantitative proteomics

- Increased nanospray sensitivity at 50-5000 nL/min LC flow rates
- Smart dopant enrichment of ionization gas for charge state control
- Easy to use plug-and-play operation
- Robust design minimizes clogging
- Superb reproducibility especially for protein quantitation
- Higher sample loading capacity delivers increased dynamic range

Patent US8227750 B1

Dynamic range of the CaptiveSpray ionization source



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