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# HIGH PERFORMANCE CHARGE DETECTION MASS SPECTROMETRY WITHOUT ULTRA-HIGH VACUUM

Tech ID: 33850 / UC Case 2025-067-0

#### PATENT STATUS

Patent Pending

## **BRIEF DESCRIPTION**

Charge detection mass spectrometry (CDMS) measurements of individual ions using either Orbitrap or electrostatic ion trap-based instruments have heretofore been performed under ultra-high vacuum conditions (10-9 Torr or lower). The rationale for this expensive and often cumbersome requirement is that these measurements need to be performed in an environment where collisions with background gas do not adversely affect the measurements.

UC Berkeley researchers have developed systems and methods that enable accurate CDMS mass measurements at pressures that are as high as  $1 \times 10$ –4 Torr, multiple orders of magnitude higher than previously demonstrated. Consistent, accurate masses were obtained for pentameric antibody complexes (-800 kDa), adeno-associated viruses (-4.8 MDa), and both -50 and -100 nm diameter polystyrene nanoparticles (-35 MDa and -330 MDa, respectively) at pressures ranging from  $1 \times 10$ –8 Torr to  $1 \times 10$ –6 Torr.

# SUGGESTED USES

» use with Charge detection mass spectrometry instruments

# **ADVANTAGES**

- » no need for the use of expensive pumps, chambers, and fittings as well as cumbersome venting/pump-down
- » less instrument downtime
- » allows for CDMS instrument designs that are significantly more compact and cost-effective.

# ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Apodization Specific Peak Fitting In Charge Detection Mass Spectrometry
- ► Multiplex Charge Detection Mass Spectrometry
- ▶ Sequential Pass Express Charge Detection Mass Analyzer
- Ambient infrared laser ablation mass spectrometry (AIRLAB-MS) with plume capture by continuous flow solvent probe
- ▶ Aerosol Ionization For Charge Detection Mass Spectrometry Ion Mobility Analysis

### CONTACT

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# **INVENTORS**

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## OTHER INFORMATION

### **CATEGORIZED AS**

- » Research Tools
  - » Other
- » Sensors & Instrumentation
  - » Medical
  - » Physical Measurement
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