

macroIMS™
MACROION MOBILITY
SPECTROMETER
MODEL 3980C

APPLICATION NOTE CHEMC-007

Publications and Patents

The *macroIMS* Macroion Mobility Spectrometry – Method for Macromolecule/Nanoparticle Analysis

- Peer-reviewed Papers
- Posters and Contributed Papers/Presentations
- Patents

Peer-reviewed Papers

1. "Electrospray Ionization Mass Spectrometry and Ion Mobility Analysis of the 20S Proteasome Complex," Loo JA, Berhane B, Kaddis CS, Wooding KM, Xie, Y, Kaufman SL, Chernushevich IV, *J. Am. Soc. Mass Spectrom.*, 2005, **16**, 998-1008.
2. "Electrospray Ion Mobility Spectrometry of Intact Viruses," Thomas JJ, Bothner B, Traina J, Benner WH, Siuzdak G, *Spectroscopy*, 2004, **18**, 31-36.
3. "Mass analysis of water-soluble polymers by mobility measurement of charge-reduced ions generated by electrosprays," Saucy DA, Ude S, Lenggoro IW, de la Mora JF, *Anal. Chem.*, 2004, **76**, 1045-1053.
4. "Mass distribution measurement of water-insoluble polymers by charge-reduced electrospray mobility analysis," Ku BK, de la Mora JF, Saucy DA, Alexander, JN, *Anal. Chem.*, 2004, **76**, 814-822.
5. "Sizing of colloidal nanoparticles by electrospray and differential mobility analyzer methods," Lenggoro IW, Xia B, Okuyama K, de la Mora JF, *Langmuir*, 2002, **18**, 4584-4591.
6. "Charge-Reduced Nano Electrospray Ionization Combined with Differential Mobility Analysis of Peptides, Proteins, Glycoproteins, Noncovalent Protein Complexes and Viruses," Bacher G, Szymanski WW, Kaufman SL, Zoellner P, Blaas D, Allmaier G, *J. Mass Spectrom.*, 2001, **36**(9), 1038-1052.
7. "Electrospray Diagnostics Performed by using Sucrose and Proteins in the Gas-Phase Electrophoretic Mobility Molecular Analyzer (GEMMA)," Kaufman SL, *Anal. Chim. Acta*, 2000, **406**, 3-10.
8. "Nucleotide Exchange in Genomic DNA of Rat Hepatocytes using RNA/DNA Oligonucleotides," Bandyopadhyay P, Ma Xiaoming, Linehan-Stieers,C, Kren BT, Steer CJ, *J. Biological Chemistry*, 1999, **274**(15), 10163-10172.
9. "Nanoparticle Detection Methods for Chemical Analysis," Koropchak JA, Sadain S, Yang X, Magnusson LE, Heybroek M, Anisimov M, Kaufman SL, *Anal. Chem.*, 1999, **4**, 386A.



10. "Controlling Charge States of Large Ions," Scalf M, Westphall MS, Krause J, Kaufman SL, Smith LM, *Science*, 1999, **283**, 194-197.
11. "Passage of MS2 Bacteriophage through Various Molecular Weight Filters," Wick CH, McCubbin PE, *Tox. Meth.*, 1999, **9**, 265-273.
12. "Analysis of a 3.6 MDa Hexagonal Bilayer Hemoglobin from *Lumbricus Terrestris* using an Electrospray Gas Phase Electrophoretic Mobility Molecular Analyzer," Kaufman SL, Kuchumov AR, Kazakevich M, Vinogradov SN, *Anal. Biochem.*, 1998, **259**, 195-202.
13. "Analysis of Biomolecules using Electrospray and Nanoparticle Methods: The Gas-Phase Electrophoretic Mobility Molecular Analyzer (GEMMA)," Kaufman SL, *J. Aerosol Sci.*, 1998, **29**, 537.
14. "Differential mobility analysis of molecular ions and nanometer particles," de la Mora JF, Eichler T, Rosell J, *TRAC – Trends in Analytical Chemistry*, 1998, **17**, 328-339.
15. "DNA Analysis using an Electrospray Scanning Mobility Particle Sizer," Mouradian S, Skogen JW, Dorman FD, Zarrin F, Kaufman SL, Smith LM, *Anal. Chem.*, 1997, **69**, 919-925.
16. "Macromolecule Analysis Based on Electrophoretic Mobility in Air: Globular Proteins," Kaufman SL, Skogen JW, Dorman FD, Zarrin F, Lewis KC, *Anal. Chem.*, 1996, **68**, 1895-1904.

Posters and Contributed Papers/Presentations

1. "Analysis of Large Supramolecular Protein Complexes by Mass Spectrometry and Gas-Phase Mobility," Loo JA, Kaufman SL, Chernushevich I. Presented at *American Society for Mass Spectrometry*, Annual Meeting, Montreal. 2003.
2. "Quantitative Protein Characterization with Gas-Phase Electromobility," Shang TQ, Johnston MV, *Proc. 50th ASMS Conference on Mass Spectrometry and Allied Topics*, Orlando, FL. 2002.
3. "Gas-Phase Electrophoretic Molecular Mobility Analysis at Atmospheric Pressure of High Mass Hetero- and Homo-Noncovalent Biocomplexes in Comparison with UV MALDI MS Analysis," Allmaier G, Bacher G, Zehl M, Sutton C, Kaufman S, Szymanski WW, *Proc. 49th ASMS Conference on Mass Spectrometry and Allied Topics*, Chicago, IL., 2001.
4. "Investigating Intact Viruses with Charge-Detection MS and Ion Mobility," Benner WH, Hack CA, Traina JA, *Proc. 49th ASMS Conference on Mass Spectrometry and Allied Topics*, Chicago, IL. 2001
5. "Charge-Reduced ESI with Differential Mobility Analysis of Biopolymers and Non-covalent Complexes," Allmaier G, Bacher G, Kaufman S, Szymanski WW, *Proc. 47th ASMS Conference*, Dallas, TX, p348. 1999.
6. "Molecular Mass Determination of Noncovalent Complexes and Biopolymers—Proteins and Carbohydrates—by Applying a Gas Phase Electrophoretic Mobility Mass Analyzer," Allmaier G, Bacher G, Kaufman S, Szymanski WW, *J. Aerosol Sci.*, 1999, **30**, Suppl. 1, S303-S304.
7. "GEMMA (Gas Phase Electrophoretic Mobility Molecular Analyzer)—A Tool for the Study of Biopolymers and Non-covalent Biocomplexes in Combination with Separation Techniques," Allmaier G, Kaufman S, Linnemayr KI, Szymanski WW. Presented at *17th International Symposium on the Separation of Proteins, Peptides, and Polynucleotides (ISPPP97)*, Rockville, MD. 1997.
8. "Size Determination of an Oligonucleotide by Gas-Phase Electrophoretic Mobility Molecular Analysis or GEMMA," Bandyopadhyay P, Kaufman SL, Kren BT, Steer C J, Presented at *American Association of Pharmaceutical Scientists Annual Meeting*, Boston. 1997.
9. "Comparison of Molecular Mass Data of Biomolecules Obtained by GEMMA and MALDI-TOF-MS," Szymanski WW, Kaufman SL, Linnemayr K, Allmaier G, Presented at *European Aerosol Conference*, Hamburg. 1997.
10. "Aerosol Methods for Biological Macromolecule Detection and Analysis," Kaufman SL, Paper 122, *U.S. Army ERDEC Scientific Conference on Chemical and Biological Defense Research*, Aberdeen Proving Ground, MD. 1995.

Patents

1. "Electrospray Apparatus for Producing Uniform Submicrometer Droplets," Kaufman SL, Zarrin F, Dorman F, U.S. **Patent No. 5,247,842**. 1993.
2. "Method and Apparatus for Determining Concentration of Macromolecules and Colloids in a Liquid Sample," Zarrin F, Kaufman SL, Dorman F, U.S. **Patent No. 5,076,097**. 1991a.



UNDERSTANDING, ACCELERATED

TSI Incorporated – Visit our website www.tsi.com for more information.

USA	Tel: +1 800 874 2811	India	Tel: +91 80 67877200
UK	Tel: +44 149 4 459200	China	Tel: +86 10 8251 6588
France	Tel: +33 4 91 11 87 64	Singapore	Tel: +65 6595 6388
Germany	Tel: +49 241 523030		