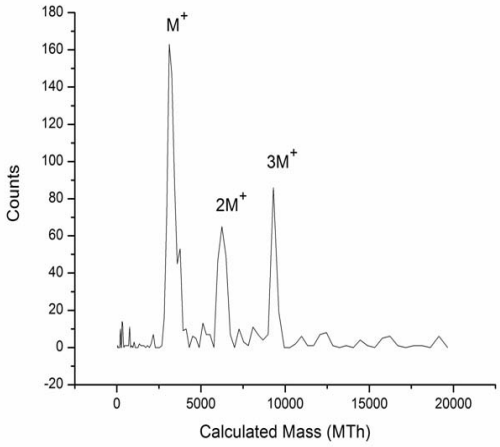
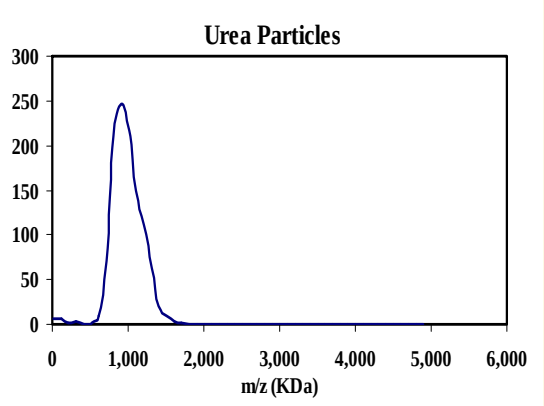
Giga-Dalton Mass Spectrometry

Major leap forward for Mass Spectrometry Applications to Life Sciences

Polystyrene latex bead(s)
2.73GDa, 5.46GDa, 8.19GDa



Urea Particles 1 MDa



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Summary
Current techniques to study large bio-molecules using mass spectrometer require fragmentation for the mass-to-charge ratios to be within the working range of the mass spectrometer. Analysis of the data is complex and often requires simulation supported by fragmentation libraries. Furthermore, the working range of the mass spectrometer is limited to the Kilo-Dalton range and offered by high end expensive instruments. These are major limiting factors in the applications of mass spectrometry for analyzing viruses or large bio-molecules that are typically in the Mega to Giga Dalton mass range.

Scientists at ORNL have developed a system for mass spectrometry that allows intact large molecules to be mass analyzed. In addition, this system increases the working range of the mass spectrometer by at least a six orders of magnitude into the Giga--Dalton mass range. This system has been used to analyze individual, singly charged proteins, such as Myosin (a ~ 200 Kilo-Dalton protein), and has observed nanoparticles of urea and polystyrene latex beads that are in the Giga-Dalton range.

Advantages
- High resolution mass analysis of intact proteins, viruses and other massive biological species
- Increases the working range of the mass spectrometer into Giga-Dalton mass range while maintaining mass resolution

Patents
- Ultra High Mass Range Mass Spectrometer Systems (UTB – ID 1723, UTB – ID 1871 and UTB – ID 1305) , US Patent 6,972,408

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