

# Adding an optical spectroscopy dimension to mass spectrometric analysis

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Mark Johnson  
Department of Chemistry  
<http://jlab.chem.yale.edu>

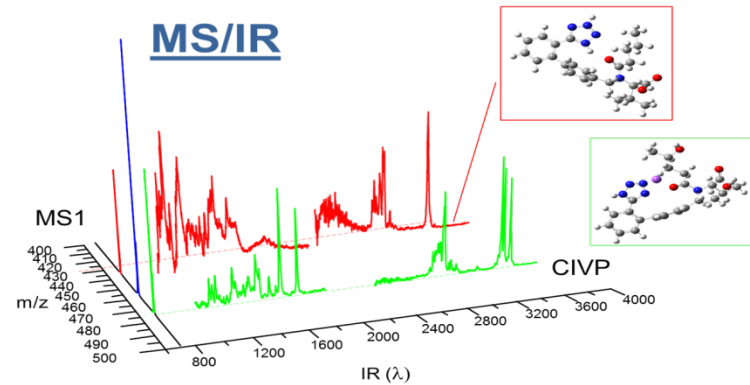
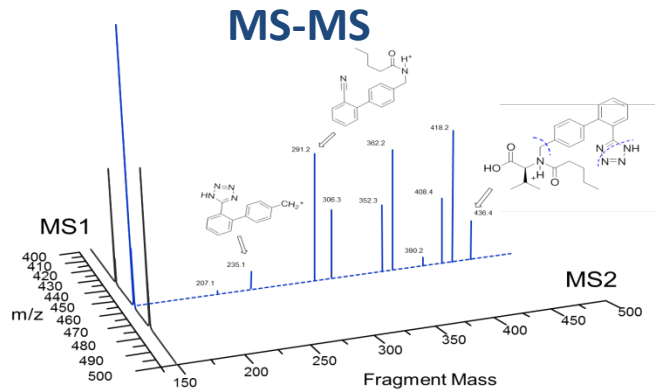


Mass Spectrometry

*"These instruments alone are able to reveal the principles of the natural substances; hence chemists should be ordered to employ them rigorously in all their experiments."*  
Antoine-Laurent Lavoisier, 1786

Traditional structural analysis in mass spectrometry: "MS<sup>n</sup>"

Extend to obtain UV/Vis/IRI spectra of each ion: MS-IR

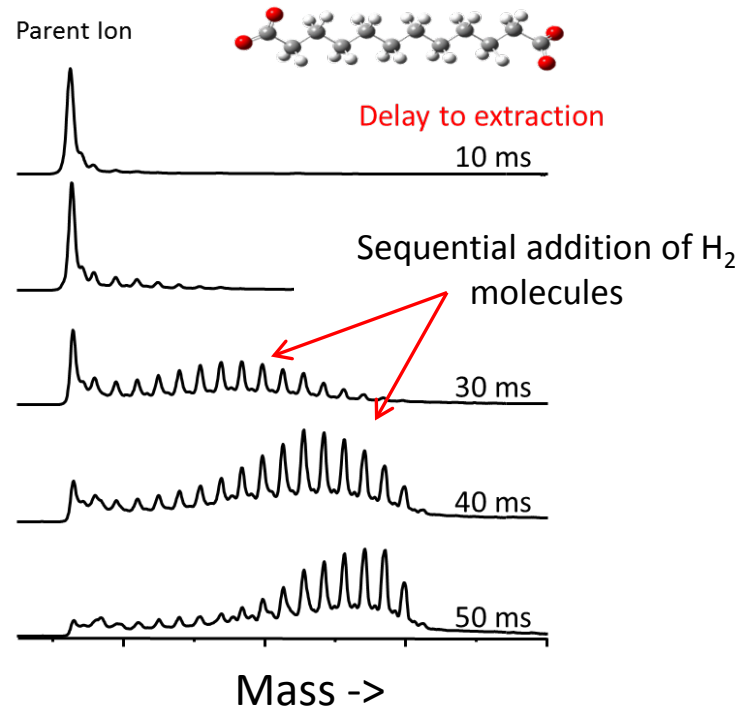
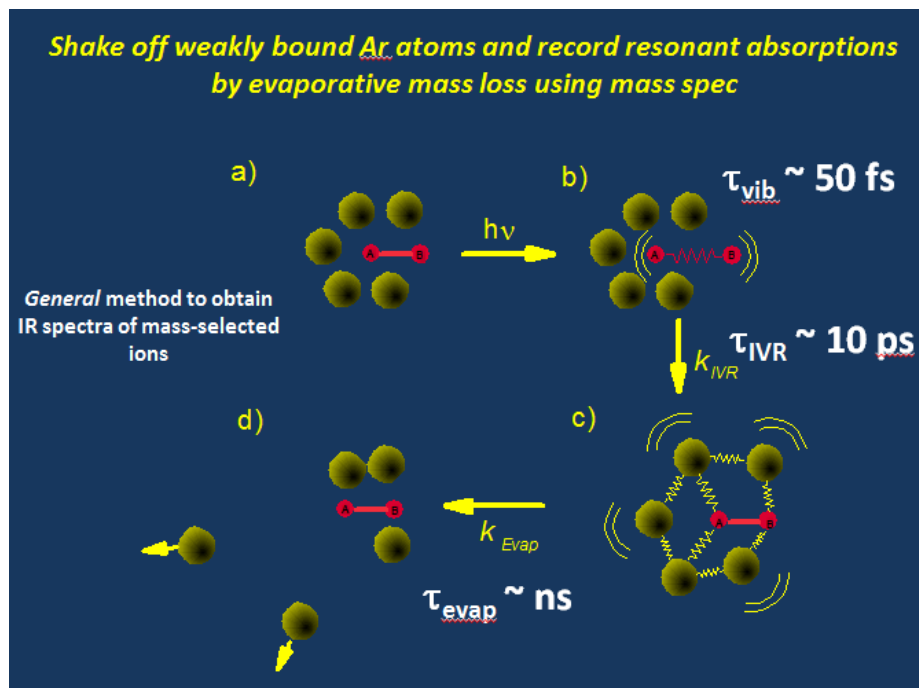


Ultrasensitive metabolomics

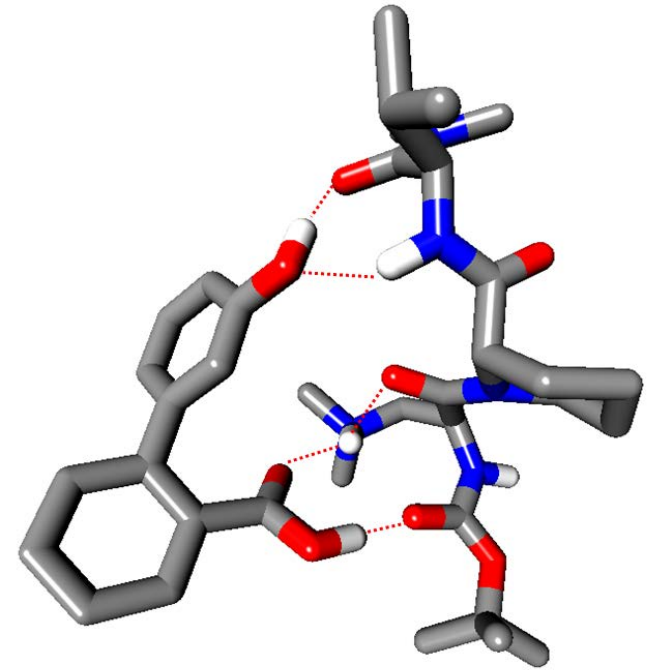
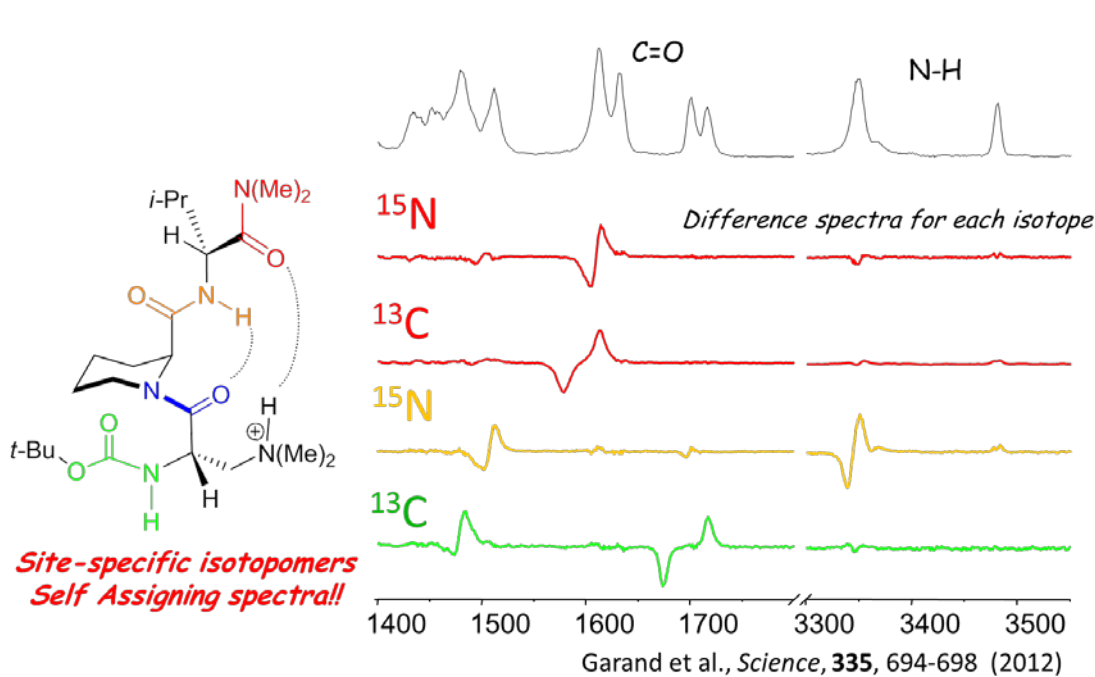
# Can't measure FTIR spectra of ions...not enough of them to see attenuation of light



Grow an H<sub>2</sub> “ice cap” on a target ion



# Get structures of non-covalently bound complexes and folded biopolymers using local bond frequencies: "isotope-edited" spectroscopy



# Infrastructure needs

- Machine shop (WL + student shop)
- Mass spec support (**coordinate** Keck, WC and CBIC (new position/Fabian Menges)
- **Electronics support (missing!!): Digital and analogue/computer-driven IO interfaces (Could have used this yesterday to mix two high voltage RF frequencies in an ion trap!!!)**