

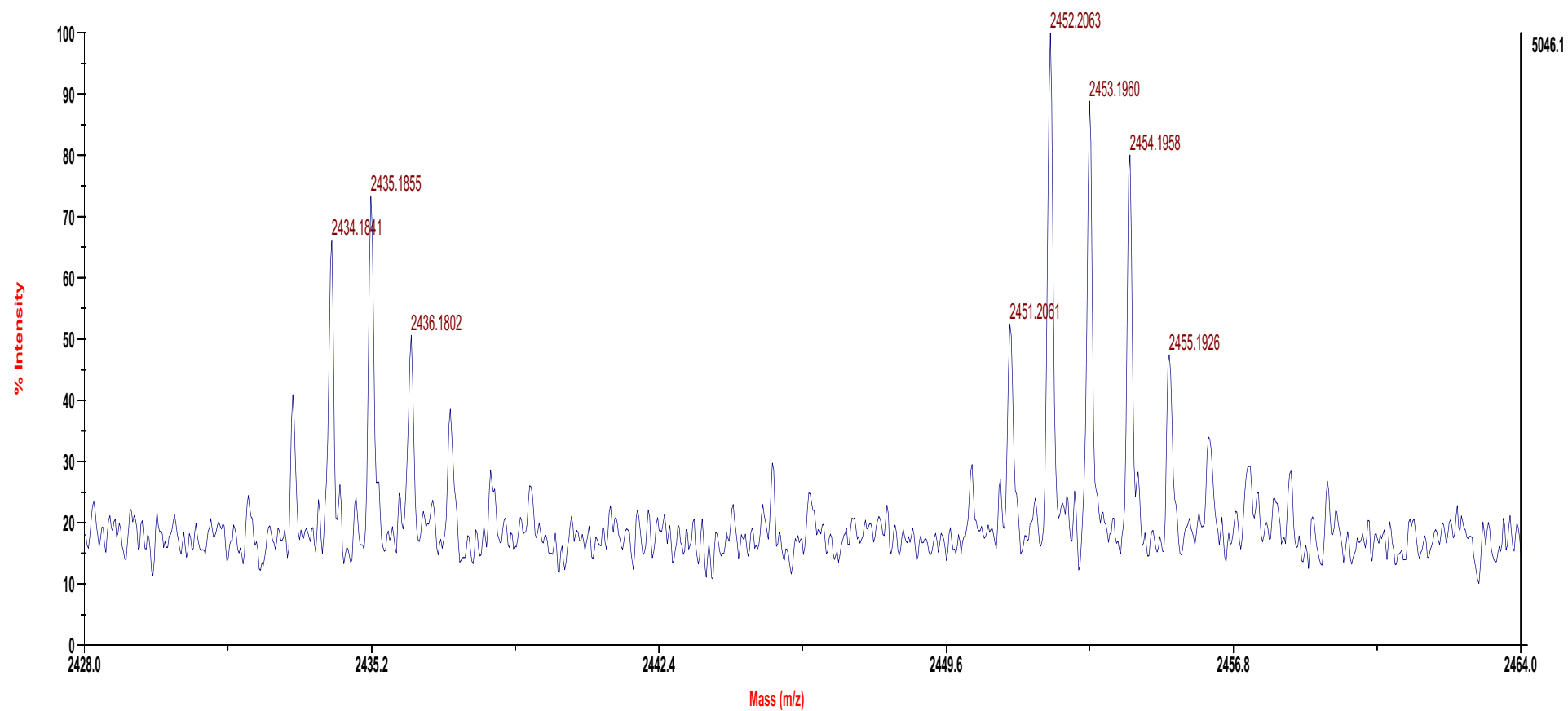
Why is resolution so important?

Z	Name	Symbol	Mass of Atom (u)	% Abundance
1	Hydrogen	^1H	1.007825	99.9885
	Deuterium	^2H	2.014102	0.115
	Tritium	^3H	3.016049	*
6	Carbon	^{12}C	12.000000	98.93
		^{13}C	13.003355	1.07
		^{14}C	14.003242	*
7	Nitrogen	^{14}N	14.003074	99.632
		^{15}N	15.000109	0.368
8	Oxygen	^{16}O	15.994915	99.757
		^{17}O	16.999132	0.038
		^{18}O	17.999160	0.205

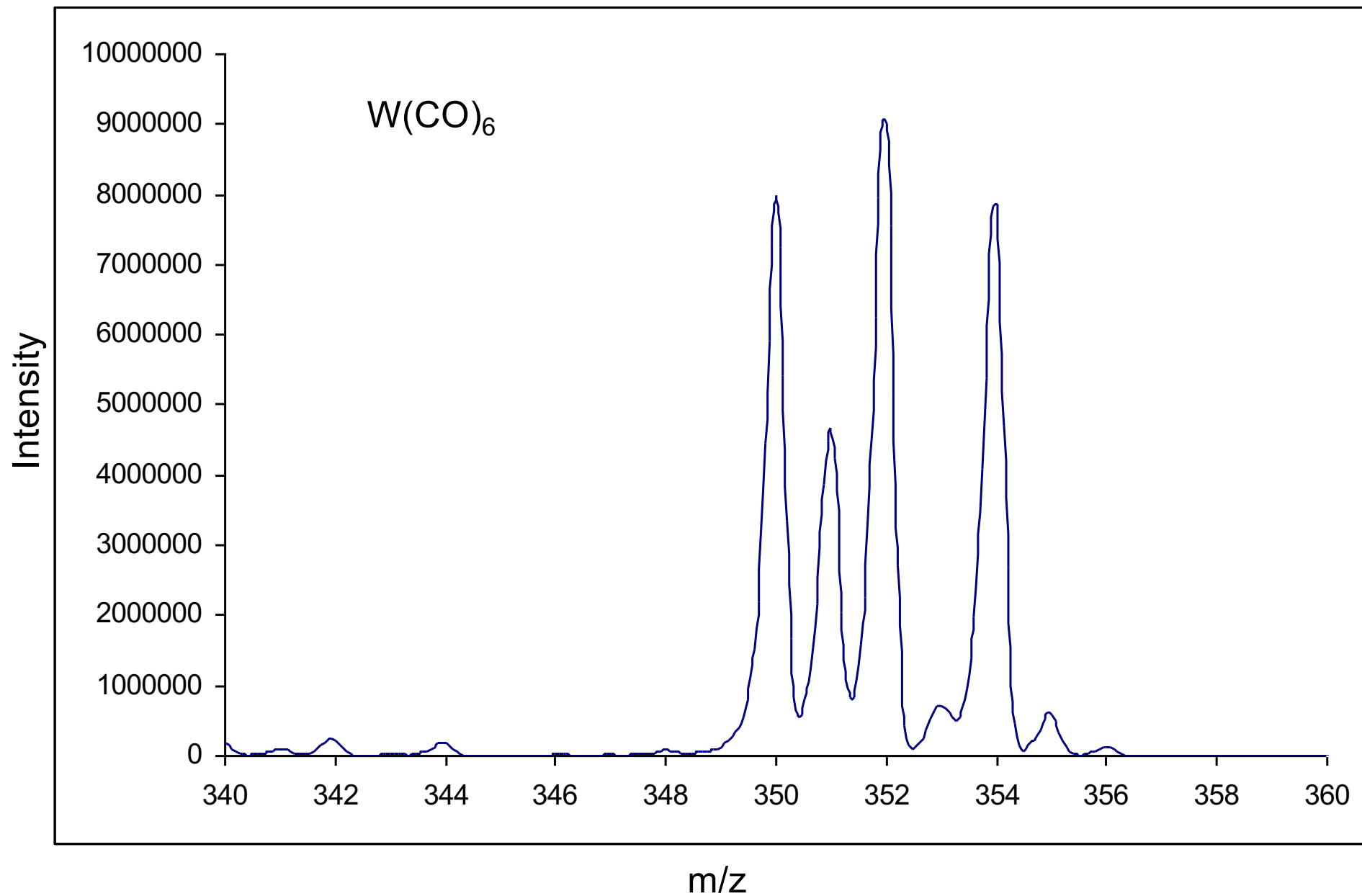
Have the students calculate the accurate mass of CO and N₂.

Mass Distribution of a Peptide with differing C₁₃ amounts

Voyager Spec #1[BP = 1395.8, 5907]

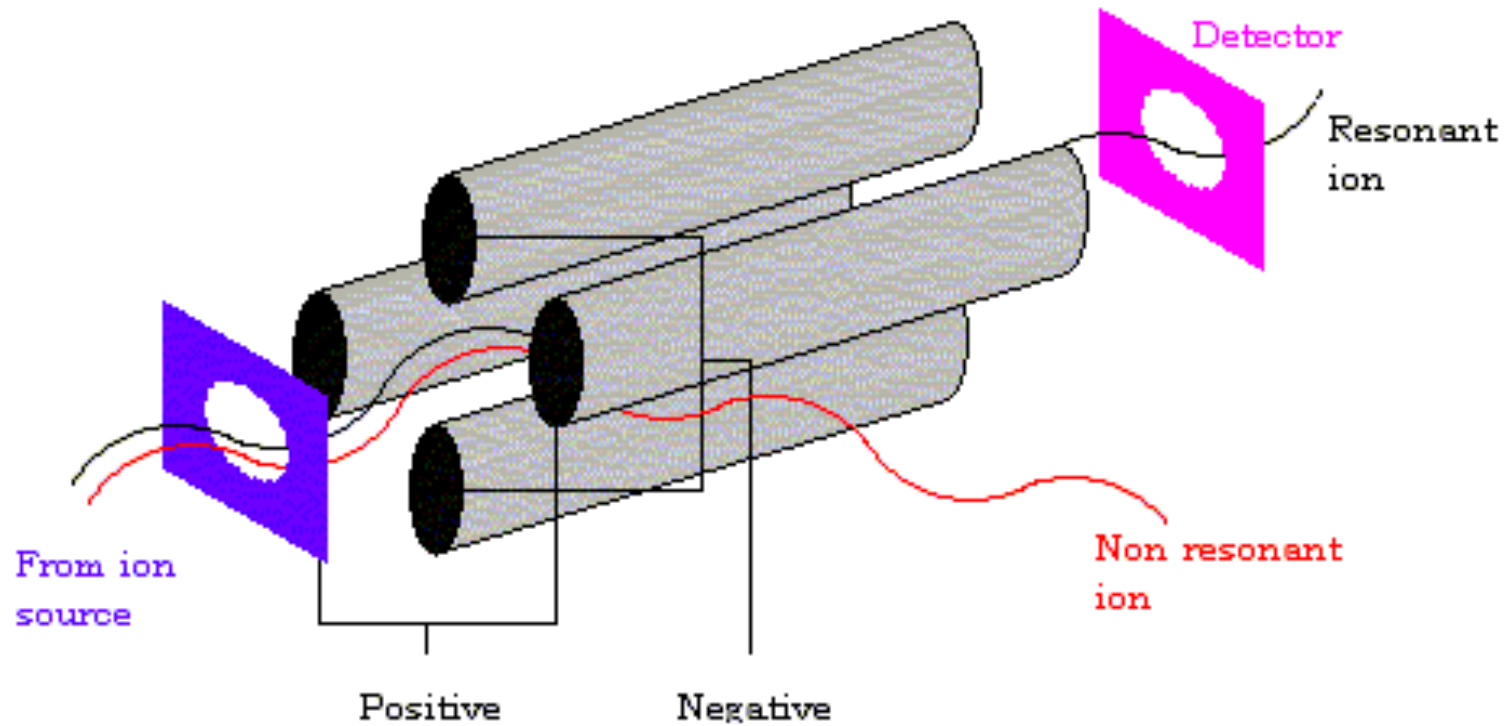


Example of MS capability to See Isotopes



Collected on Polaris Ion Trap Mass Spectrometer

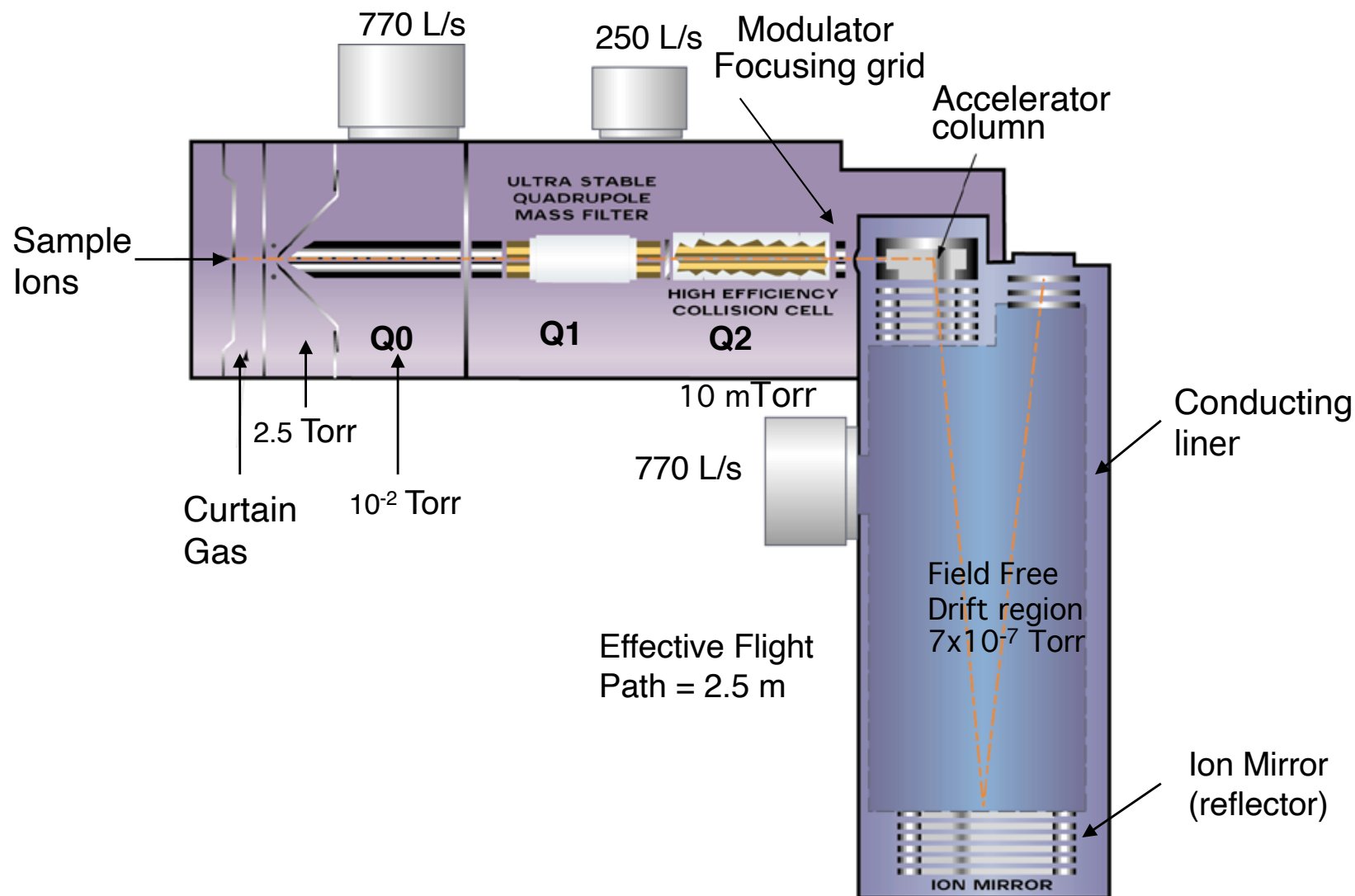
Quadrupole Ion Guide



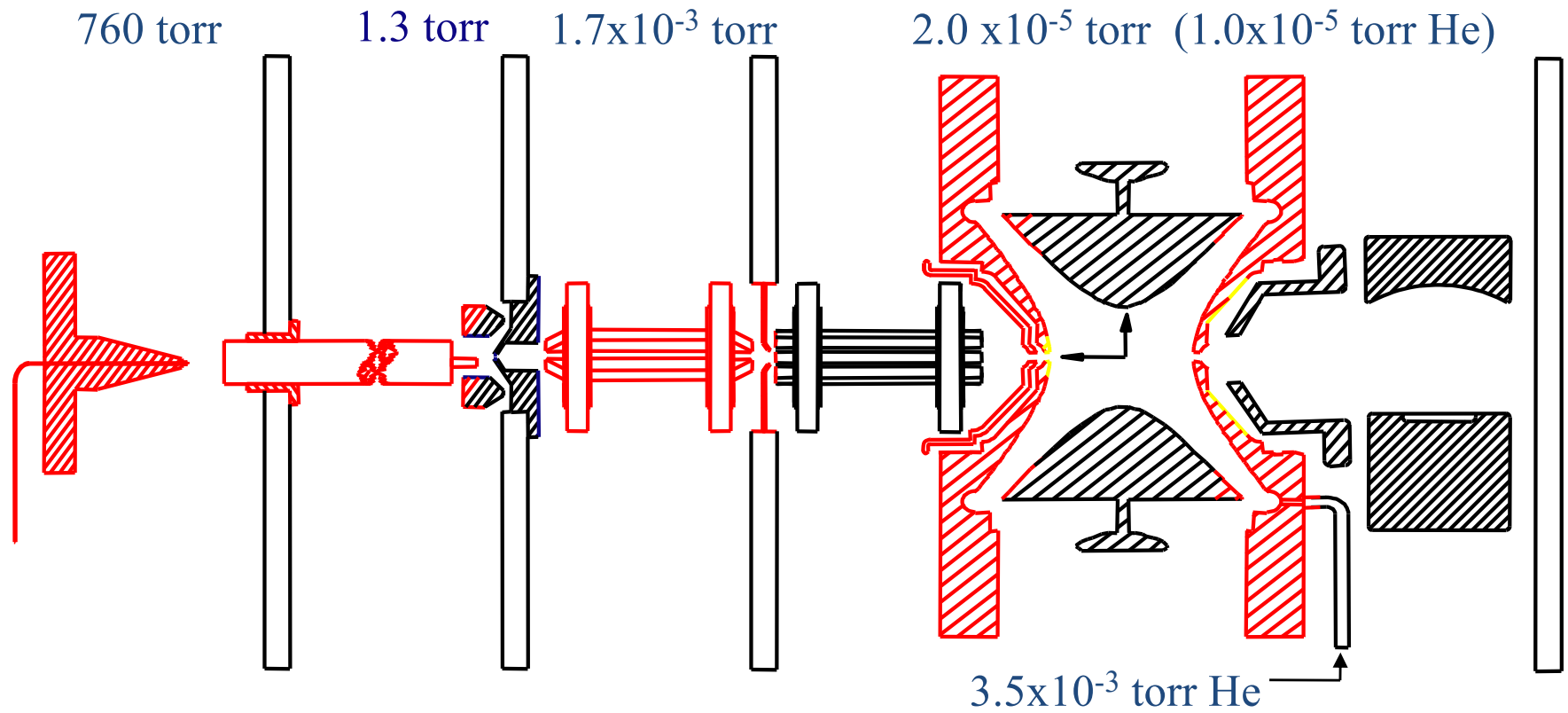
$$M = \frac{0.136V}{r_o^2 f^2}$$

$$f = \frac{\omega}{2\pi}$$

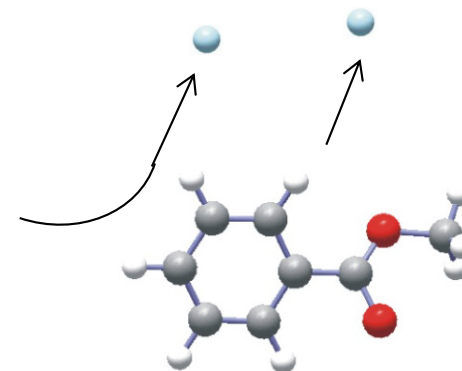
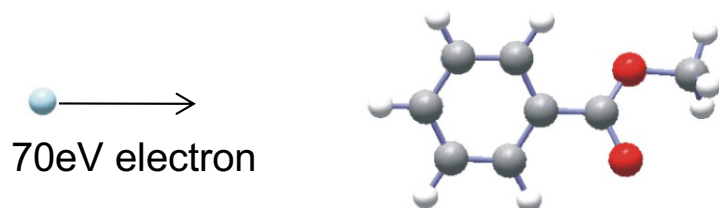
Hybrid Q-TOF



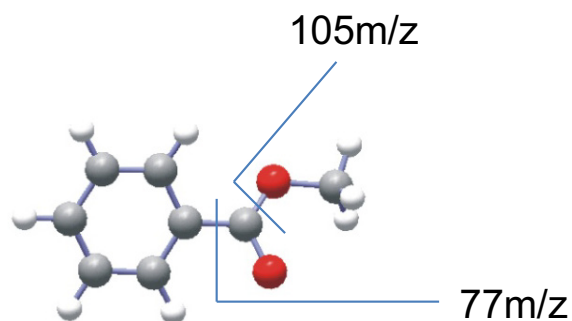
Quadrupole Ion Trap



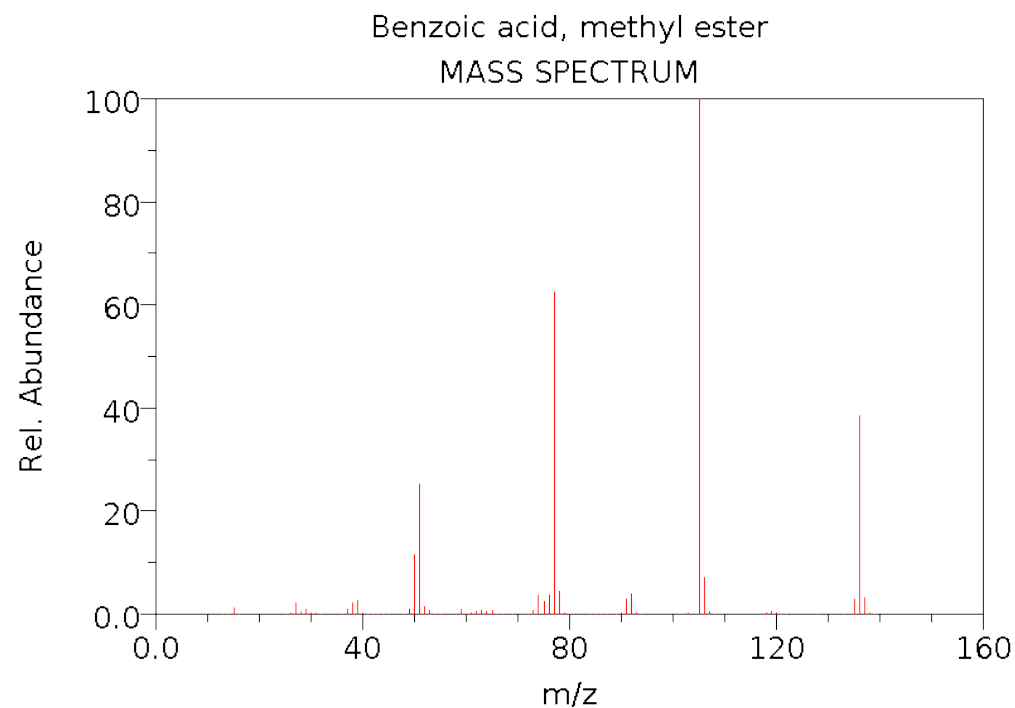
Electron Impact



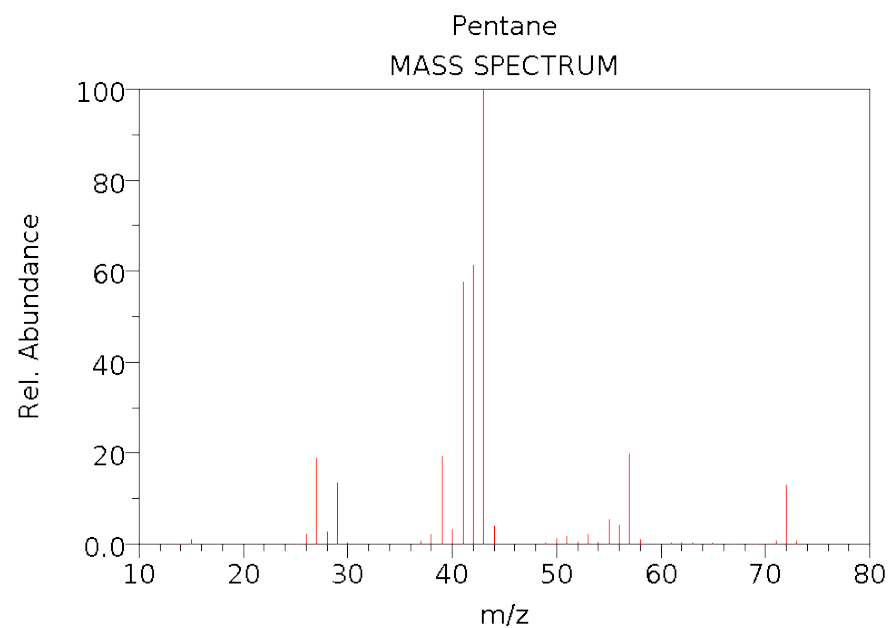
Electron Repulsion leads to energy transferred into molecule of interest, and ejection of another electron, leading to a positive charged “parent ion” (136m/z on below spectrum).



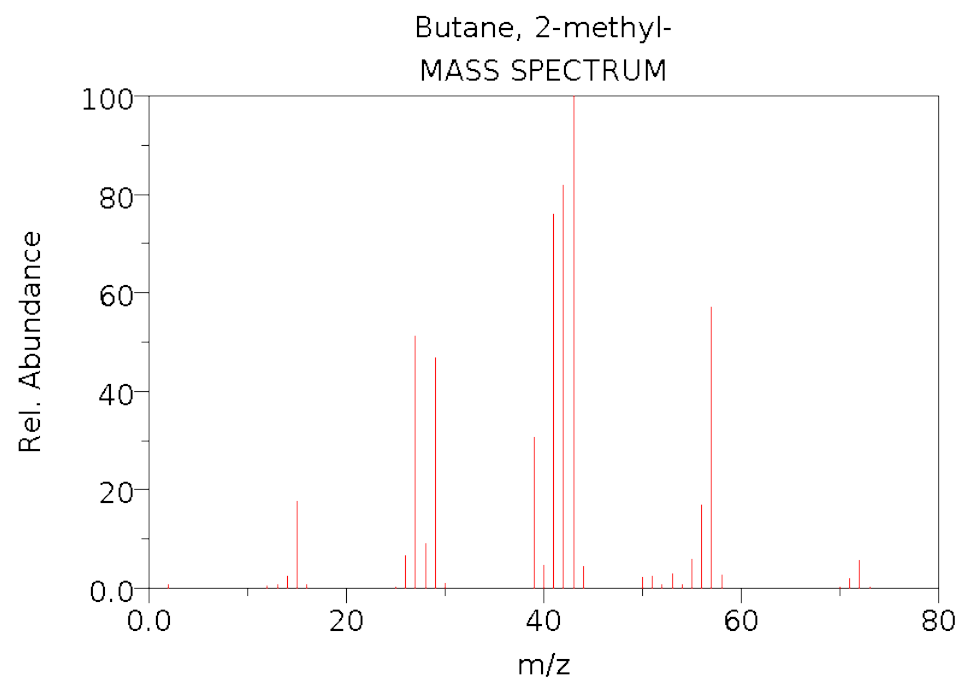
The “parent ion” may still have a lot of internal energy from the event, and may fragment according to bonding rules. This leaves us with a unique fragmentation pattern that gives us some structural information.



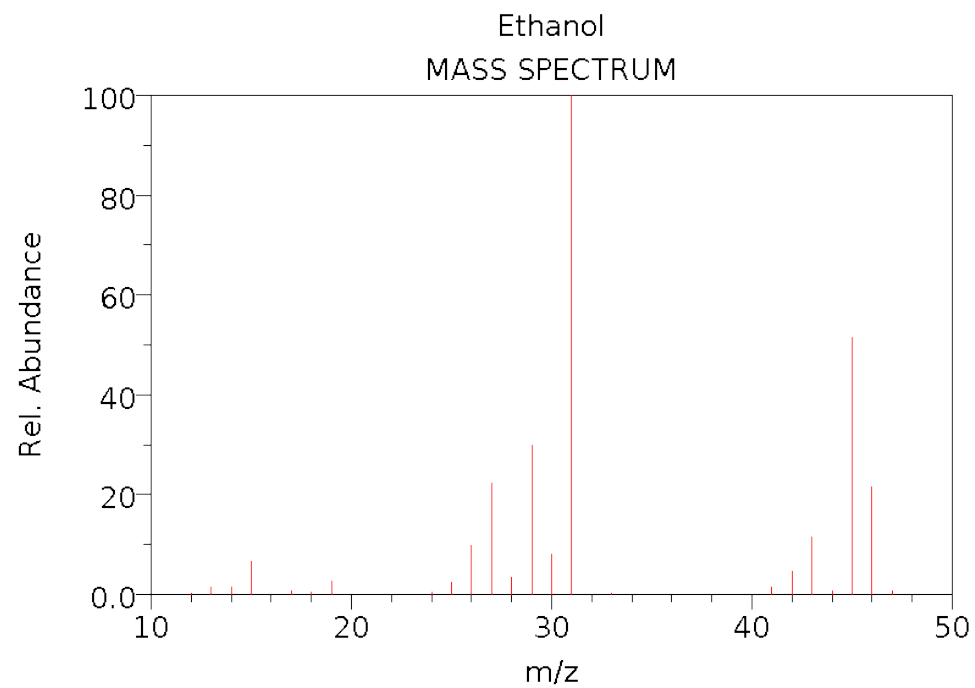
NIST Chemistry WebBook (<http://webbook.nist.gov/chemistry>)



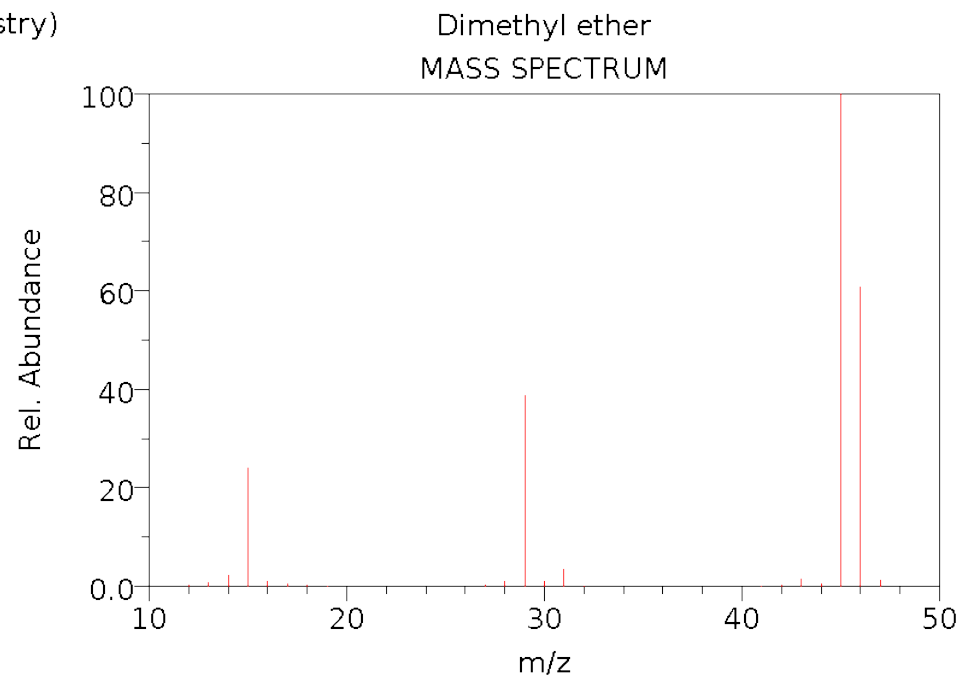
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