

inject sample

> electron source

#### Mass spectrometry Part V Detector lightest (2) heater to vapourise sample charged particle beam (x electron beam ionises sample heaviest magnetic field separates particles based on mass charge ratio particles accelerated into magnetic field





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# Typical fragmentation of functional groups

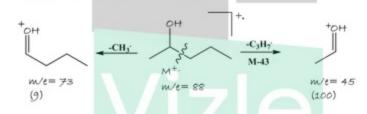
- ✓ Alkanes [Straight Chain, Branched, Cyclic]
- ✓ Alkenes [Straight Chain, Cyclic]
- ✓ Alkynes
- ✓ Aromatics



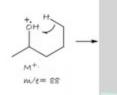
## V D Fragmentation - Alcohols

The molecular ion peak is usually very weak or absent for alcohols.

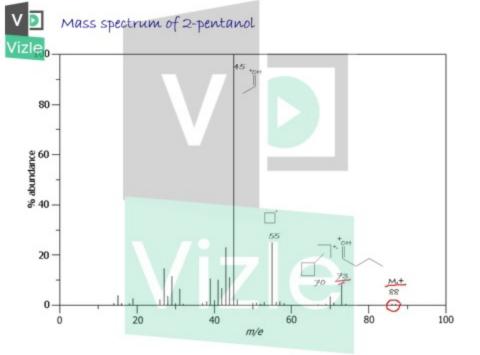
The most important fragmentation process for alcohols involves the loss of an alkyl group ( $\alpha$ -cleavage). The largest alkyl group is preferentially lost as shown



V second common mode of fragmentation involves Vizio hydration. The importance of this fragmentation process increases with increasing chain length. Loss of water (M - 18) is very indicative of an alcohol functionality

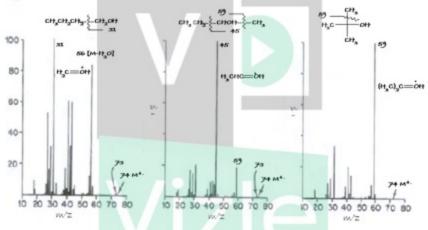








### We can distinguish isomers e.g. butanol



Mass spectra of the three isomers of butanol

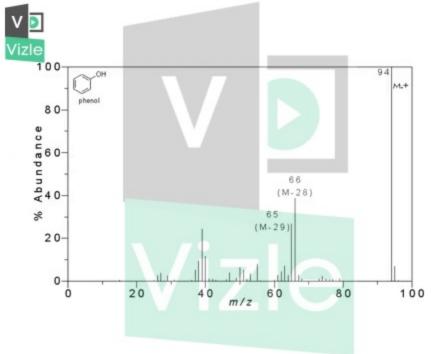
### >henols can lose the elements of carbon monoxide to give VizIestrong peaks at M - 28.

Phenols can also lose the elements of the formyl radical (HCO·) to give strong peaks at M - 29.

$$\begin{array}{c}
\downarrow \\
M^{+} \\
W/\ell = 94
\end{array}$$

$$\begin{array}{c}
\downarrow \\
W/\ell = 66
\end{array}$$

$$\begin{array}{c}
\downarrow \\
W/\ell = 65
\end{array}$$



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