

**Strategy**

1. Try to get a molecular formula.
  - a. more than likely, the molecular weight of our unknown is 94 ( $M^+$  seen on the mass spectrum as  $m/z = 94$ ).
  - b. other than C and H, what other atoms are in our molecule?
    - i.  $M^+$  is even, so even number of nitrogens (probably zero)
    - ii. IR shows an OH stretch at  $3300\text{ cm}^{-1}$  and no  $C=O$  near  $1700\text{ cm}^{-1}$
    - iii. Halogens not seen in mass spectrum
  - c. to find molecular formula, assuming only C, H and O
    - i. Subtract one oxygen from 94 ( $94 - 16 = 78$ ) and add C and H into 78.

$C_5H_{18}O$  - not possible

$C_6H_6O$  - looks like a winner

$C_7O$  - mass > 94 - can't work

2. Degree of unsaturation = 4

3. If degree of unsaturation is equal to or greater than 4, a benzene ring is likely

4. Carbon NMR shows 4 signals in the  $C=C$  region - this could be a benzene ring that has an element of symmetry so that it has 4 electronically unique carbons.

