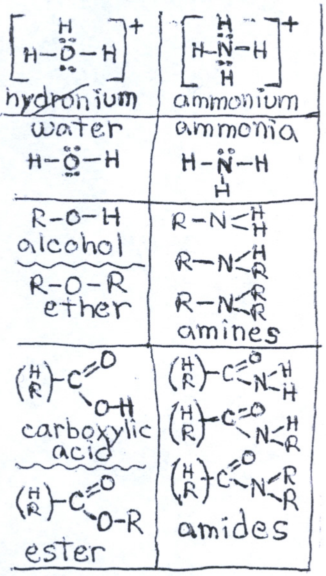
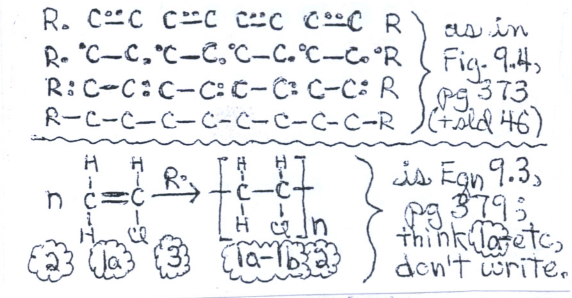
Quiz 8a

Functional Groups are summarized on handout in Learn@UW: alkane (hydrocarbon, only single bonds, C-H); alkanes (family); alkene (with one or more C=C double bonds, but without the alternating C=C's of "aromatics" with benzene...) ; alkyne . As shown below, categories "split" for O, are "lumped" for N, so more categories for O (alcohols ≠ ethers) than for N (only amines , =) ; also (carboxylic acid ≠ ester) vs (only amides). Amino Acids have amine-C and acid-C, differ only by R-group; in 108, R is ≈ any group that begins with C, **unless** it's a C=O.



Addition Polymers in Lecture 30 (Nov 26, Slides 22-91/end) plus URL on Slide 45, and CiC (371-373, 374-381 with heads/tails on 379-380). Also, my pictures below show: • how 2 electrons in the second bond of C=C help form 2 monomer-connecting bonds in the polymer ; • 4-step reminders for writing a condensed equation: **1a** (draw correct monomer structure and related repeating-unit structure with 2 Cs) and **1b** (unit-connecting bonds cross the brackets); **2** (put "n" on left & right sides, with n monomers & n rep-units); **3** (write catalyst over-the-arrow, R•). / Use same reminders in rxn-equations for condensation polymers: **1a** for structures of monomer & repeating-unit, **1b** for monomer-linking bonds across brackets; **2**, n for each di-functional monomer on left, n for repeating-unit on right, but 2n H_2O. **3** puts catalyst (H^+) over the arrow. / For aa's → polypeptide, **#2** has "n H_2O".



Addition Polymer: no atoms lost, polymer = sum of monomers.
Condensation Polymer: lose H_2O (or...), polymer < sum of m's.

Condensation Polymers – explained in Lectures 31-32, in CiC 382-387, and below – are *condensed* by losing H_2O (as H, OH) and the "losers" (bond-losing atoms) bonding with each other so they still have correct number of bonds: C (4), N (3), O (2).

In Chem 108 this occurs in two analogous ways, to form an **ester** (from *carboxylic acid* losing OH, alcohol losing H) or **amide** (from *carboxylic acid* losing OH, amine losing H), and in similar reactions to form a polyester or polyamide.

To form a polymer, we need: • two di-functional monomers (di-acid, di-alcohol: poly**ester**) or (di-acid, di-amine: poly**amide**) with di-acid and di-alcohol each forming bonds to left & right. Later, • two-function monomers (amino acids, w amine & acid on ends); triglyceride (non-polymer), tri-alcohol + 3 fatty acids.

-COOH loses H^+ in acid-base rxn , OH to form ester or amide, which: • is reality (confirmed in experiments using O-isotopes); • lets us think about forming ester & amide in analogous ways.