The index of hydrogen deficiency (IHD): the sum of the number of rings and pi bonds in a molecule To determine IHD, compare the number of hydrogens in an unknown compound with the number in a reference hydrocarbon of the same number of carbons and with no rings or pi bonds
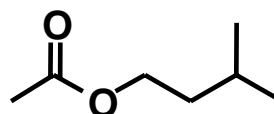
the molecular formula of the reference hydrocarbon is C_nH_{2n+2}

$$IHD = \frac{(H_{reference} - H_{molecule})}{2}$$

- **for each atom of a Group 7 element (F, Cl, Br, I), add one H**
- **no correction is necessary for the addition of atoms of Group 6 elements (O,S) to the reference hydrocarbon**
- **for each atom of a Group 5 element (N, P), add one hydrogen**

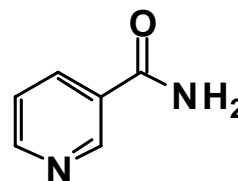**Problem:** isopentyl acetate has a molecular formula of $C_7H_{14}O_2$. Calculate its IHD

- reference hydrocarbon C_7H_{16}
- IHD = (16-14)/2 = 1

Isopentyl acetate

Problem: calculate the IHD for niacin, molecular formula $C_6H_6N_2O$

- reference hydrocarbon C_6H_{16}
- IHD = (16 - 6)/2 = 5

Niacin