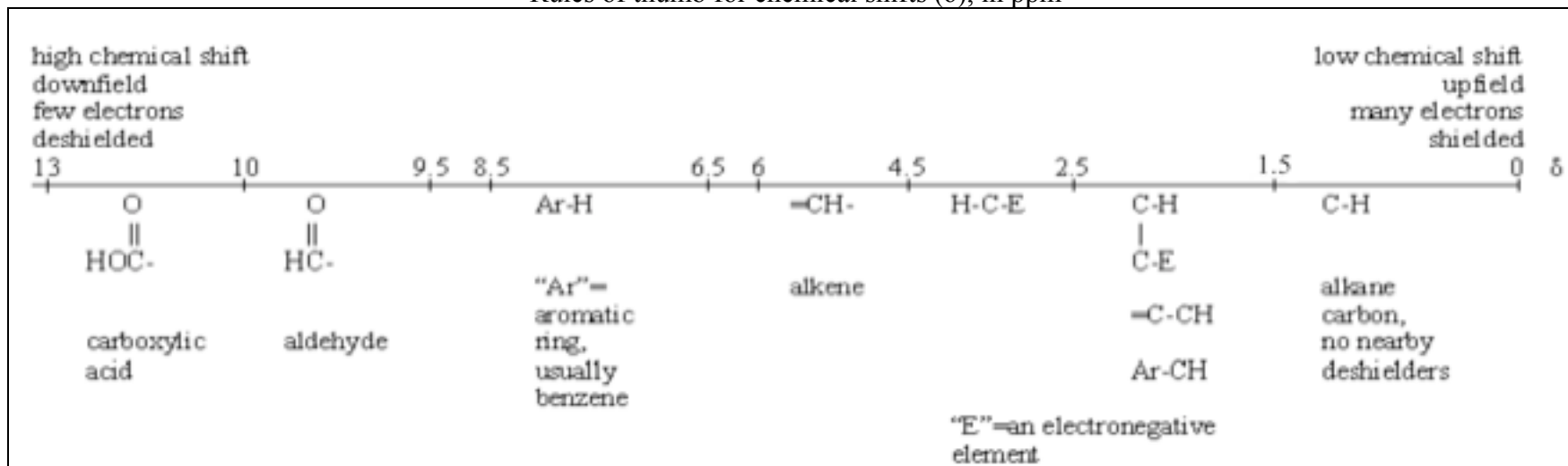


Rules of thumb for chemical shifts (δ), in ppm


These are just rules of thumb; there are exceptions.

Within each range, hydrogens on tertiary carbons tend to be shifted left; hydrogens on primary carbons tend to be shifted right.

Alcohol hydrogens: chemical shifts from 0.5-6.0; no splitting; often broad.

Alkyne hydrogens: chemical shifts from 2.0 to 3.0.

$$\text{degrees of unsaturation} = \frac{2 + 2 \times \#C + \#N - \#X - \#H}{2}$$

= # pi bonds + # rings

"X" = halogens. The number of oxygens does not affect the degrees of unsaturation.