Stereoisomerism

3) Cahn–Ingold–Prelog (CIP) System

Rule 1) Rank substituents by Z of attached atoms

- highest Z ⇒ priority #1
- lower Z ⇒ priority #2

\[ \text{CHBrClF} \]

\[ \text{Rule 2) Arrange so #4 is in back} \]

\[ \text{Rule 3) Trace out arc } \]

\[ \text{if cw ⇒ R isomer} \]

\[ \text{ccw ⇒ S isomer} \]

\[ \text{Rule 4) Tie-breaker - compare lists of Z for attached to directly attached atom} \]

\[ \text{= Sort from high Z to low Z} \]

(S)-ibuprofen

(Active)

\[ \text{H}_3C \]

\[ \text{OH} \]

\[ \text{H} : 1 \]

\[ \leq \text{ #4} \]

- COOH: 6 \((8, 8, 8)\) #1

- CH3: 6 \((1, 1, 1)\) #3

as drawn: (cw)

(substituted): 6 \((6, 6, 6)\) #2

(but H in front!)

⇒ if H in back ⇒ ccw ⇒ S