



Nomenclature of Heterocyclic Compounds Part 2



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Recommended Textbook:

Heterocyclic Chemistry, 5th Edition, J. A. Joule, K. Mills, **2010**, Wiley



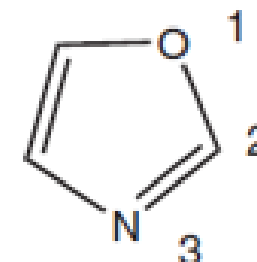
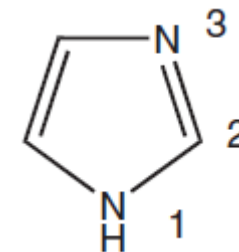
Systematic Naming of Monocyclic Compounds

Rings with more than one heteroatom

- The order of priorities is derived from the **groups** of the Periodic System, and then within each group by **increasing atomic number**:

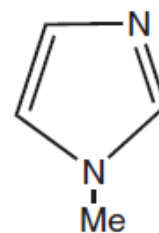
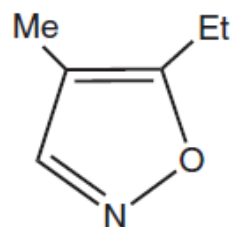
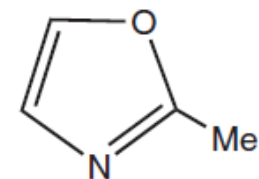
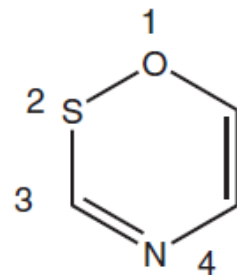
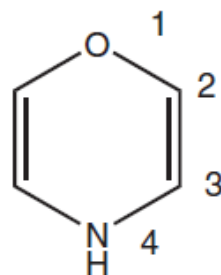
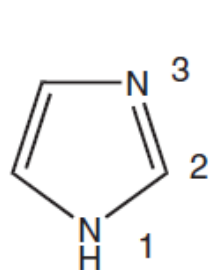
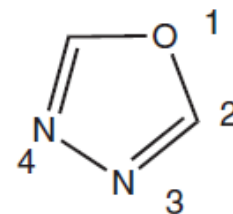
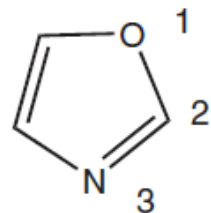
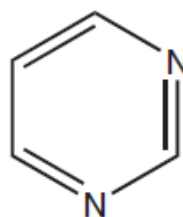
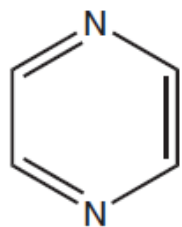
Group VI (O>S>Se>Te) > **Group V (N>P>As)** > **Group IV (Si>Ge)** > **Group III (B)**

- Each heteroatom is then given a **number** as found in the ring, with that of highest priority given position 1
- A saturated heteroatom with an extra-hydrogen attached is given priority over an unsaturated form of the same atom, as in 1H-1,3-diazole
- The heteroatom prefixes follow the numbers in the priorities given previously
- The numbers are **grouped** together in front of the heteroatom listings (thus, 1,3-oxazole, not 1-oxa-3-azole)



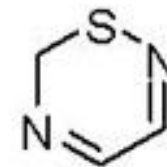
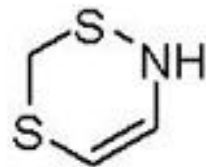
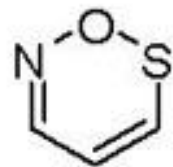
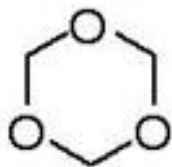
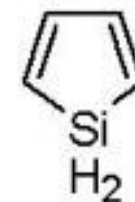
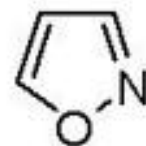
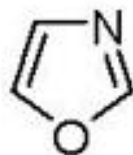
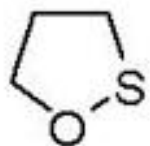
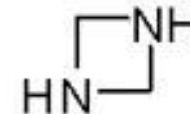
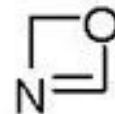
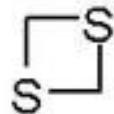
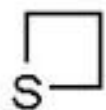
Systematic Naming of Monocyclic Compounds

Examples



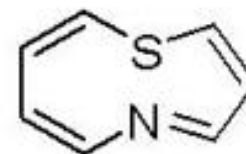
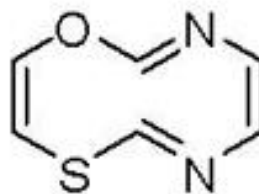
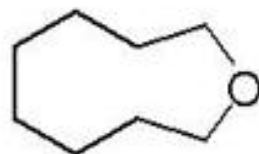
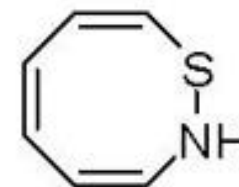
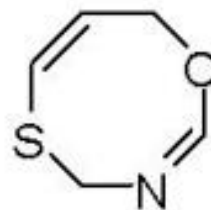
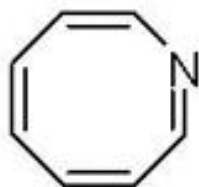
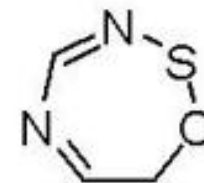
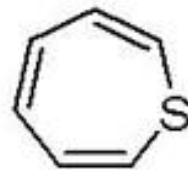
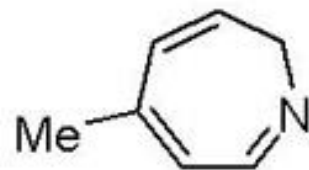
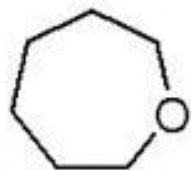
Systematic Naming of Monocyclic Compounds

Examples



Systematic Naming of Monocyclic Compounds

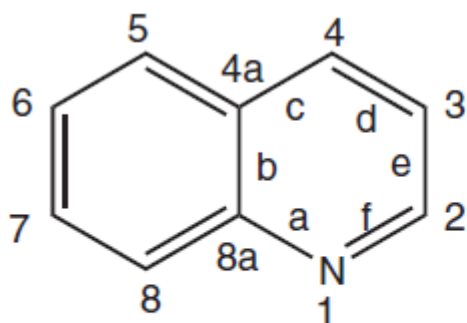
Examples



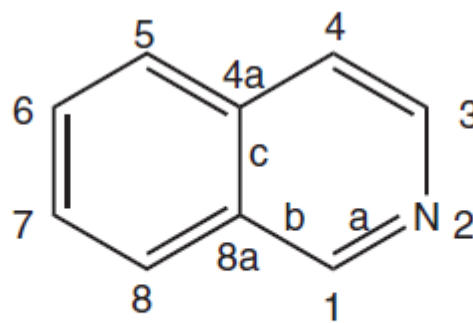
Systematic Naming of Bicyclic Compounds

Bicyclic Compounds share a common single/double bond: **fused rings**

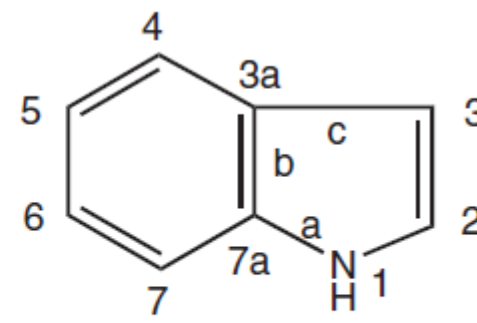
- Common case is where a **benzene** ring is fused to a heterocyclic ring. The name begins with the prefix "**benzo**"; The point of attachment is indicated by a letter that defines the "**face**" of the heterocycle involved. Thus, the **1,2-** position on the heterocyclic ring is always the "**a-face**," **2,3-** is the "**b-face**," **3,4-** is the "**c-face**," and so on
- the final numbering always **begins at a position next to the benzo group** and that the **heteroatoms are given the lowest numbers possible**, observing the O>S>N>P rule



benzo[b]pyridine
(quinoline)



benzo[c]pyridine
(isoquinoline)

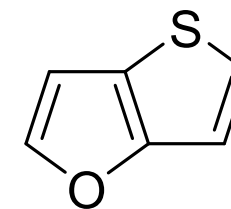
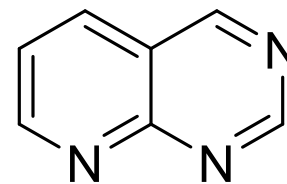
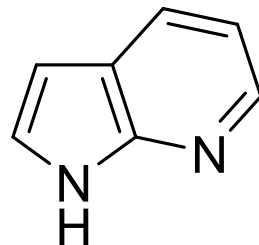
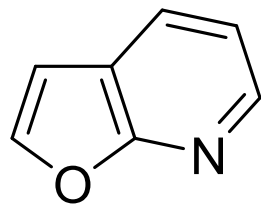
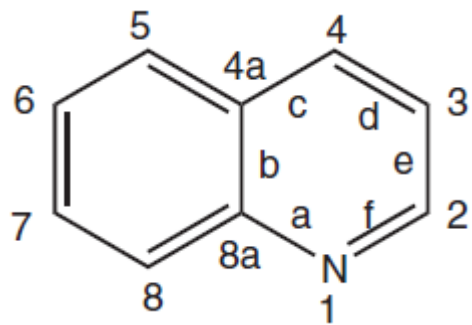


1H-benzo[b]pyrrole
(indole)

Systematic Naming of Bicyclic Compounds

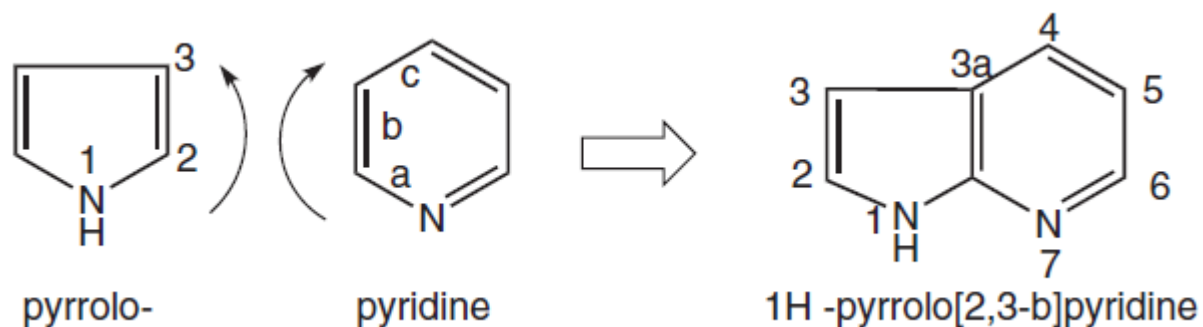
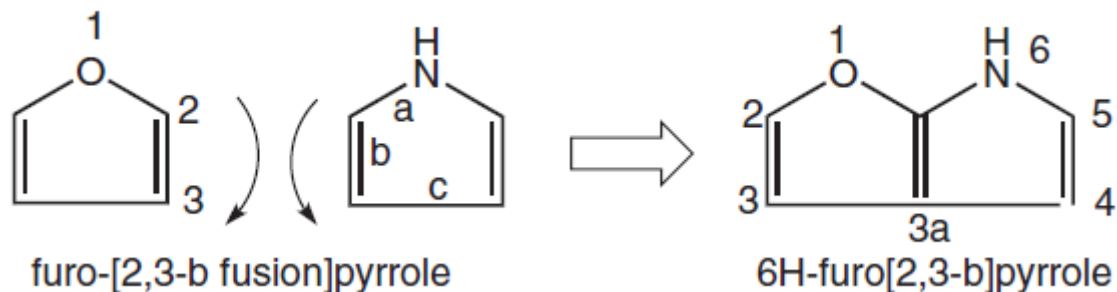
If **two heterocyclic rings** are fused, additional rules are required. A **parent ring** is selected, and the other ring is considered **fused on**, as was observed for benzene fusion. Some rules are as follows

- If one ring contains N, it is considered the parent
- If both rings contain N, the larger ring is the parent
- If both rings are of the same size, that with the most N atoms is the parent
- If no N is present, O has priority over S over P



Systematic Naming of Bicyclic Compounds

- The ring fused onto the parent has the **suffix “o”**; common names are used where possible to simplify the name
- The **face letter** of the **parent ring** where the fusion occurs is placed in brackets preceding the name of that ring. The **position numbers** of the **fused ring** are placed inside the brackets before the face letter of the parent ring



Systematic Naming of Bicyclic Compounds

- The **proper numbers** for the fused ring are those that are encountered as one goes around the ring in the **same direction** as going alphabetically around the faces of the parent

