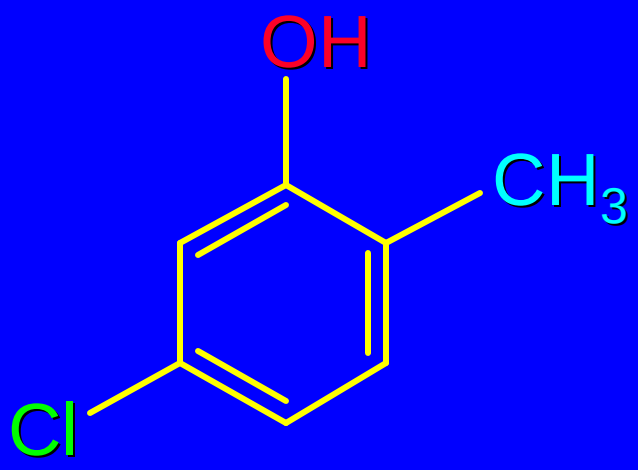
Chapter 24
Phenols

24.1
Nomenclature

Nomenclature



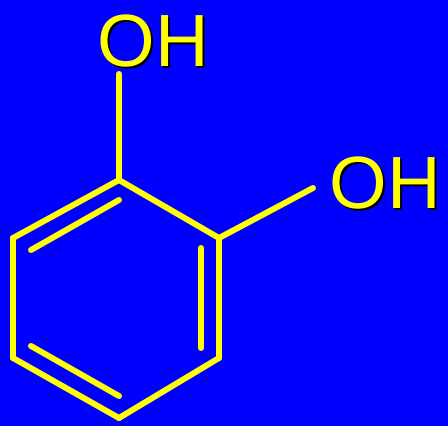
5-Chloro-2-methylphenol

named on basis of phenol as parent

substituents listed in alphabetical order

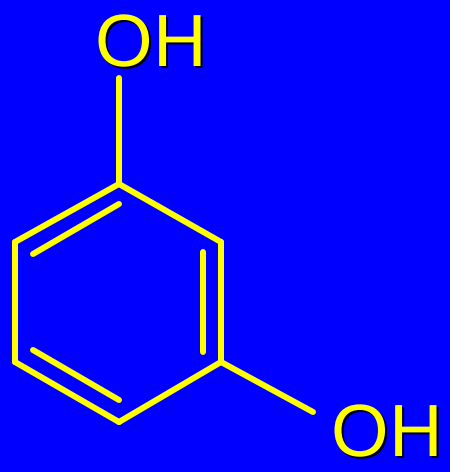
lowest numerical sequence: first point of difference rule

Nomenclature



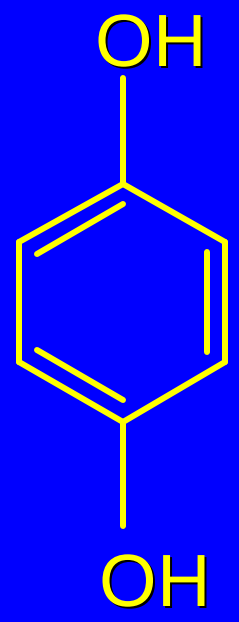
1,2-Benzenediol

(common name: pyrocatechol)



1,3-Benzenediol

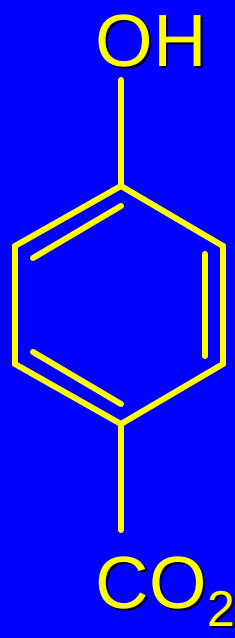
(common name: resorcinol)



1,4-Benzenediol

(common name: hydroquinone)

Nomenclature



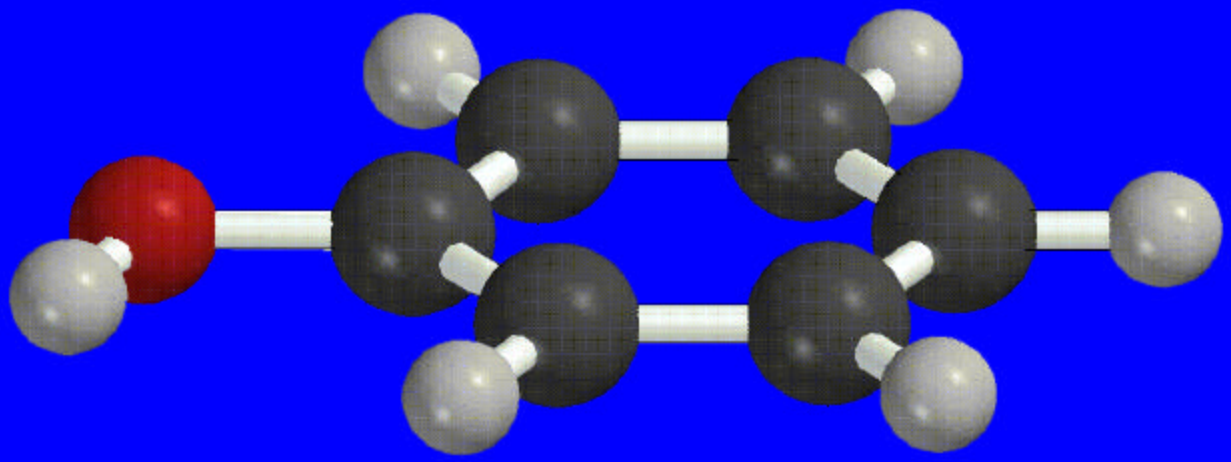
p-Hydroxybenzoic acid

name on basis of benzoic acid as parent

higher oxidation states of carbon outrank hydroxyl group

24.2
Structure and Bonding

Structure of Phenol



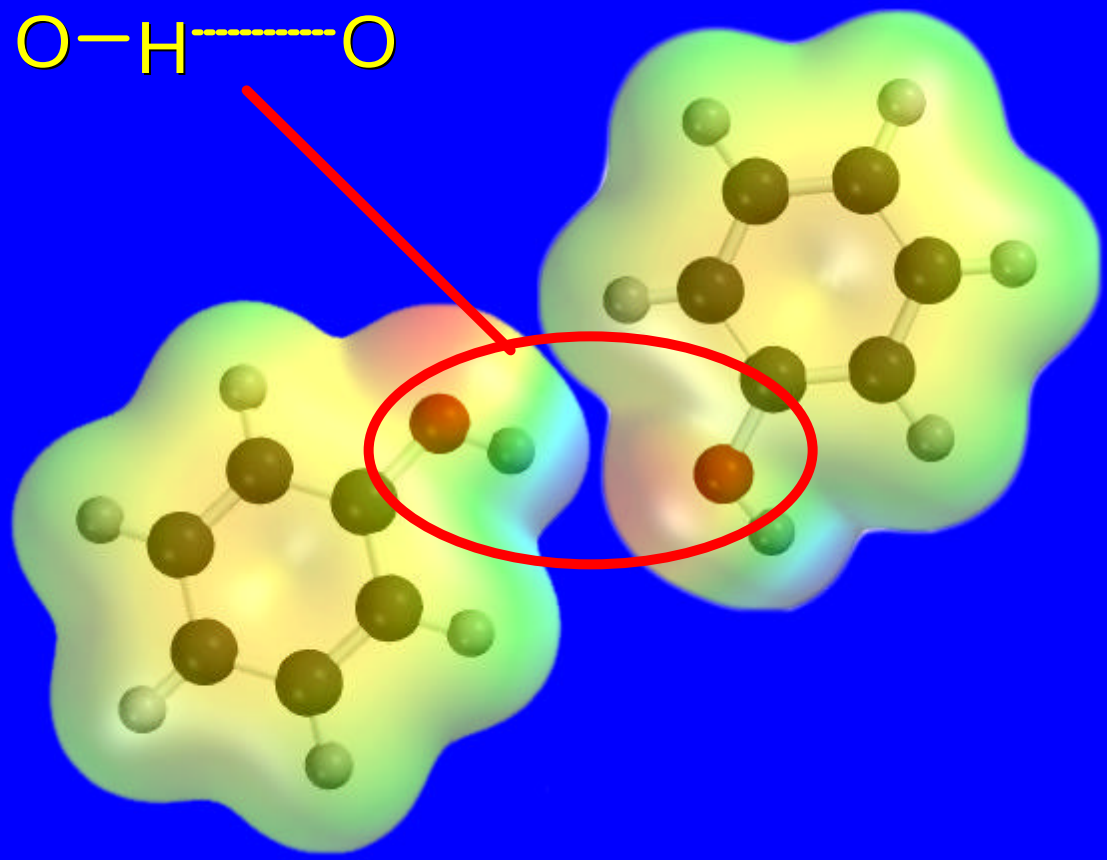
phenol is planar

C—O bond distance is 136 pm, which is slightly shorter than that of CH_3OH (142 pm)

24.3
Physical Properties

The OH group of phenols allows hydrogen bonding to other phenol molecules and to water.

Hydrogen Bonding in Phenols



Physical Properties (Table 24.1)

Compared to compounds of similar size and molecular weight, hydrogen bonding in phenol raises its melting point, boiling point, and solubility in water.

Physical Properties (Table 24.1)

	$C_6H_5CH_3$	C_6H_5OH	C_6H_5F
Molecular weight	92	94	96
Melting point (°C)	–95	43	–41
Boiling point (°C,1 atm)	111	132	85
Solubility in H_2O (g/100 mL,25°C)	0.05	8.2	0.2