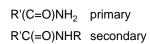
# **Nitrogen-Containing Functional Groups**

**Amides** Carboxylic amides (sulfonic, sulfinic, phosphoric, phosphonic and many other acids also form amides)





R'(C=O)NR<sub>2</sub> tertiary

acetamide N,N-dimethylformamide **DMF** 

benzamide N-methylpyrrolidone methanesulfonamide

**Amidine** Amide imines



DBU

# **Amines**

 $R_3N$ tertiary (3°)

diisopropylethylamine Hunig's base

#### **Amine oxides**

N-Methylmorpholine oxide

## Azo

azobenzene

azoxybenzene

## **Carbamates (urethanes)**

(amides of carbonic acid)

$$H_2N$$
 OH

$$Me_2N$$

carbamic acid

methyl N,N-diethylcarbamate

N,N-dimethylcarbamoyl chloride

### **Carbodiimides**

dicyclohexylcarbodiimide

#### Diazo, Diazonium

diazomethane

benzenediazonium

#### **Enamines**

#### Guanidine Imines of ureas

$$H_2N$$
 $NH$ 
 $NH_2$ 
guanidine

## **Heterocycles - aromatic**



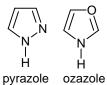




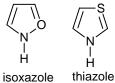


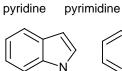




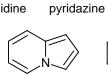








indole



indolizine



pyrazine



# **Hydrazines**

H<sub>2</sub>N-NH<sub>2</sub> Hydrazine

H<sub>2</sub>N-NHPh phenylhydrazine

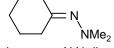


## **Hydrazones**

N-amino imines - imines of hydrazines

$$\searrow$$
 N $_{NH_2}$ 

acetone hydrazone



cyclohexanone N,N-dimethylhydrazone

## **Hydroxamic Acids**

Amides of hydroxylamine

Imides Bis-N-acylamines

$$0 \xrightarrow{H} 0 \text{ succinimide}$$

# Imines (Schiff bases)

N-phenylethanimine acetaldehyde N-phenylimine



banzalimine

#### **Nitrates** (esters of nitric acid)



nitric acid

methyl nitrate

# Nitriles (cyanides)

$$C=N-O$$

acetonitrile

benzonitrile

benzonitrile oxide

#### Nitrites (esters of nitrous acid)

nitrous acid

isoamyl nitrile

#### Nitro/Nitroso

$$\text{r}^{\text{O}}$$

nitrosobenzene

nitrobenzene

nitromethane

N-nitrosourea

#### **Nitrone**

Imine N-oxides

#### **Oximes**

Imines of hydroxylamine

# acetoxime

Urea Bisamides of carbonic acid

biuret

Urazole

Hydantoin