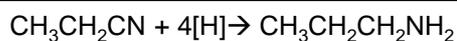




The nitriles made in the previous two reactions can then be converted into other functional groups by the following reactions

### Preparing Amines from Nitriles

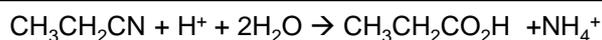
Reduce **nitrile to amine** by using **LiAlH<sub>4</sub> in ether** or by reducing with H<sub>2</sub> using a Ni catalyst



This is a reduction reaction

### Preparing carboxylic acids from Nitriles

Hydrolysing nitriles by reacting them with strong acids will produce a carboxylic acid



This is a hydrolysis reaction

C-C bonds can be added to aromatic compounds through the Friedel Craft's Reactions met in 6.1.1 aromatic compounds

### Friedel Crafts Alkylation

**Change in functional group:** benzene → alkylbenzene

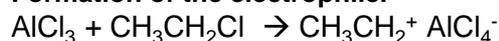
**Reagents:** chloroalkane in the presence of anhydrous aluminium chloride catalyst

**Conditions:** heat under reflux

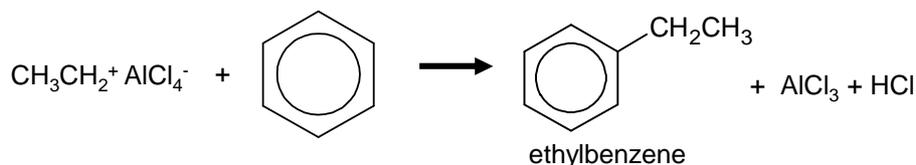
**Mechanism:** Electrophilic Substitution

Any chloroalkane can be used RCl where R is any alkyl group Eg -CH<sub>3</sub>, -C<sub>2</sub>H<sub>5</sub>. The electrophile is the R<sup>+</sup>.

**Formation of the electrophile.**



**Overall Equation for reaction**



### Friedel Crafts Acylation

**Change in functional group:** benzene → phenyl ketone

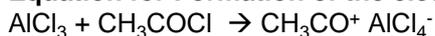
**Reagents:** acyl chloride in the presence of anhydrous aluminium chloride catalyst

**Conditions:** heat under reflux (50°C)

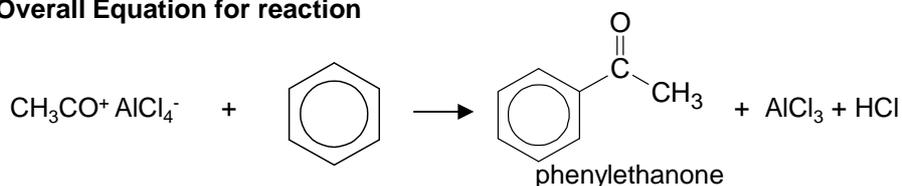
**Mechanism:** Electrophilic Substitution

Any acyl chloride can be used RCOCl where R is any alkyl group e.g. -CH<sub>3</sub>, -C<sub>2</sub>H<sub>5</sub>. The electrophile is the RCO<sup>+</sup>.

**Equation for Formation of the electrophile.**



**Overall Equation for reaction**



These are important reactions in organic synthesis because they introduce a reactive functional group on to the benzene ring