Nucleophilic Aromatic Substitution

Dramatically different conditions when compared with the electrophilic aromatic substitution (EAS):
- Leaving group is necessary
- Electron deficient aromatic rings react fastest (deactivated toward EAS)
- Strong base is used as the nucleophile
- This can be thought of as an addition-elimination reaction

EWG ortho and para to leaving group is optimum:
additional resonance stabilization by withdrawing electrons into nitro groups
Benzyne Reaction

Aromatic rings without strong electron withdrawing groups will not react with nucleophiles unless at very high temperatures and pressures. Chemists at Dow first observed this reaction in 1928 in their large-scale preparation of phenol from chlorobenzene and sodium hydroxide at 340°C and a pressure 2500 psi.

Radio-labelling studies suggest that the mechanism involves a peculiar intermediate called benzyne.