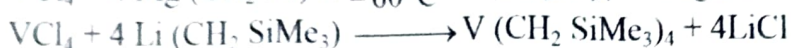
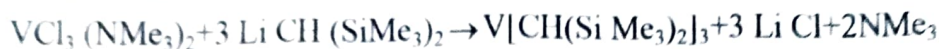
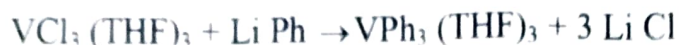


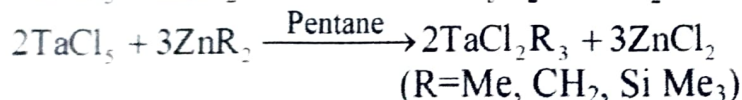
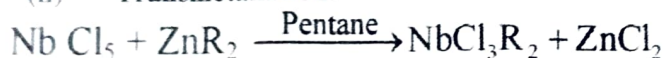
Transition Metal - Aryl and Alkyl Complexes

Number: $5(dsp^3)$ Example: $TaMe_5$, Oxidation Number +5; Coordination Number: $6(d^2sp^3)$
 Example: $[TaPh_6]$ are present in the group. General methods for synthesis are:

(i) **Halide exchange**

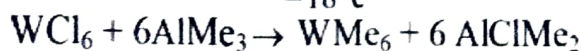
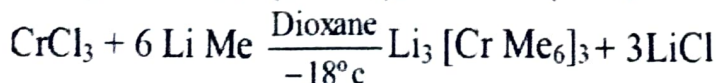
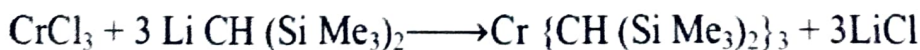
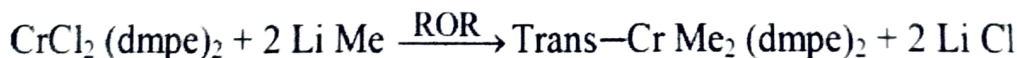


(ii) **Transmetallation:**

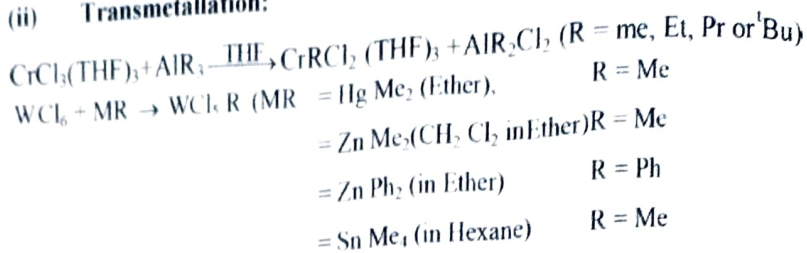


4. **Group 6 - d^4 Metals:** Cr [Oxidation Number +2; Coordination Number: $4(dsp^2)$
 Example: *Trans*- $CrMe_2(dmpe)_2$, $6(d^2sp^3)$ Example: $[Cr_2Me_8]^{4+}$; Oxidation Number +3;
 Coordination Number: $3(sp^2)$ Example: $Cr(CH_2Ph)_3$, $4(sp^3)$ Example: $[CrPh_4]$, $6(d^2sp^3)$
 Example: $CrPh_3(THF)_3$; Oxidation Number +4; Coordination Number: $4(sp^3)$ Example: $CrMe_4$,
 $6(d^2sp^3)$ Example: $[CrMe_6]^{2-}$], Mo [Oxidation Number +2; Coordination Number: $5(dsp^3)$
 Example: $Mo(CH_2Ph)(CO)_3(\eta^1-C_5H_5)$; Oxidation Number +3; Coordination Number: $6(d^2sp^3)$
 Example: $(Mo_2Me_{10})^{4+}$; Oxidation Number +4; Coordination Number: $4(sp^3)$ Example:
 $Mo(CH_2Ph)_4$ and W [Oxidation Number +3; Coordination Number: $6(d^2sp^3)$ Example: $W_2Me_8^{2-}$
 ; Oxidation Number +4; Coordination Number: $4(sp^3)$ Example: $W(CH_2Ph)_4$, $6(d^2sp^3)$ Example:
 WPh_6^{2-} ; Oxidation Number +5; Coordination Number: $5(dsp^3)$ Example: $W(Ph)_5$; Oxidation
 Number +6; Coordination Number: $6(d^2sp^3)$ Example: WMe_6] are present in the group. General
 methods for synthesis are:

(i) **Halide exchange method:**

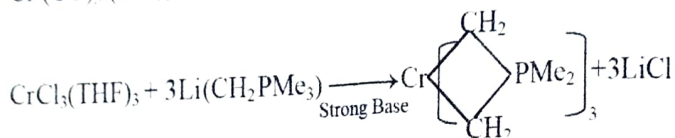
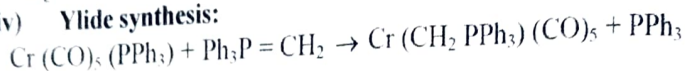


(ii) **Transmetallation:**



(iii) **Reaction of Anionic Metal Complexes with Organic Halides:** Sodium salts of carbonilate are generally used in the synthesis of molybdenum hydrocarbyls. Example:
 $\text{Na}[\text{Mo}(\text{CO})_5 \eta^5\text{-C}_5\text{H}_5] + \text{Ph CH}_2\text{Cl} \rightarrow \text{Mo}(\text{CH}_2\text{Ph})(\text{CO})_5(\eta^5\text{-C}_5\text{H}_5) + \text{NaCl}$

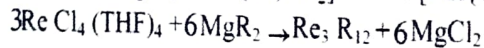
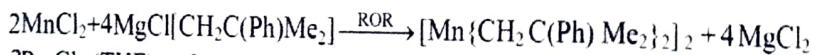
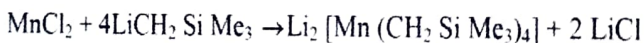
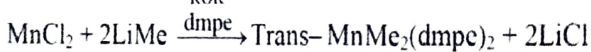
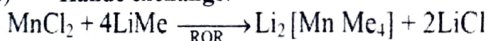
(iv) **Ylide synthesis:**



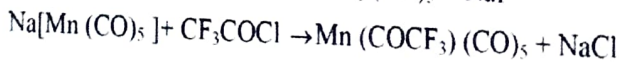
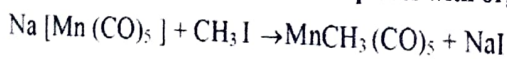
5. **Group 7 - d⁵ Metals:** Mn [Oxidation Number +1: Coordination Number: 6(d²sp³) Example: Mn(CF₃)(CO)₅; Oxidation Number +2: Coordination Number: 4(sp³) Example: MnMe₂(dmpe)₂; Oxidation Number +3: Coordination Number: 4(sp³) Example: [Mn(CH₂CMe₂PPh₃)₃]₂] and Re [Oxidation Number +3: Coordination Number: 4(sp³) Example: Re₂(μ-SiMe₃)₂(CH₂SiMe₃)₄, 6(d²sp³) Example: Re₂Me₈²⁻; Oxidation Number +4: Coordination Number: 6(d²sp³) Example: Re₃(CH₂SiMe₃)₁₂; Oxidation Number +6: Coordination Number: 6(d²sp³) Example: ReMe₆] are present in the group.

General methods for synthesis are:

(i) **Halide exchange:**



(ii) **Reactions of anionic metal complexes with organic halides:**



(iii) **Insertion of unsaturated compounds in M-C bond:**

