

Electron Counting Worksheet
Foundation Molecules of Transition Metal Organometallic Chemistry

Give formula, IUPAC and/or abbreviated, common names if not given. For each, give 3-dimensional structure and symmetry point group assignment. Give the electron count, oxidation state of metal, and any special bonding or geometrical considerations.

1. Zeise's Salt: $K^+[(\eta^2-C_2H_4)PtCl_3]^-$
2. ferrocene (and metallocenes); Cp_2FeH^+
3. $Cp_2Ti(CO)_2$
4. Cp_4Ti ; Cp_4Zr ; $Cp_2Fe(CO)_2$
5. Cp_2WH_2
6. $Fe(CO)_5$, $Fe_2(CO)_9$, $Fe_3(CO)_{12}$
7. $Fe(CO)_4(C_2H_4)$; $Fe(CO)_4(C_2F_4)$
8. $Fe(CO)_4PR_3$
9. $M(CO)_6$ $M = Cr, Mo, W$
10. $Mn(CO)_5Cl$; $Mn_2(CO)_{10}$; $Mn(CO)_5^-$; $MeMn(CO)_5$; $MeCr(CO)_5^-$
11. $(C_3H_5)Mn(CO)_5$, $(C_3H_5)Mn(CO)_4$, $(NO)Mn(CO)_4$
12. $[CpFe(CO)_2]_2$, $CpFe(CO)_2^-$, $CpFe(CO)_3^+$, $CpFe(CO)_2Cl$, $CpFe(CO)_2H$
13. $Co_2(CO)_8$; $HCo(CO)_4$; $Co(CO)_3NO$
14. Vaska's "salt": $(Ph_3P)_2Ir(CO)Cl$
15. "Wilkinson's" catalyst: $(Ph_3P)_3RhCl$
16. Fischer carbene: $(OC)_5W(=C(OMe)Ph)$
17. Schrock carbene: $Cp_2Ta(Me)(=CH_2)$
18. Tebbe's reagent: $Cp_2Ti(CH_2AlMe_2)(\mu-Cl)$
19. $(\mu-H)W_2(CO)_{10}^-$; $(\mu-SR)_2Fe_2(CO)_6$; $(\mu-S_2)Fe_2(CO)_6$; $(\mu-S)_2Fe_2(CO)_6^{2-}$
20. $(H_2)W(CO)_5$; $H_4Mo(diphos)_2$