Introduction to Organometallic Chemistry
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IV) Questions based on reactions with oxidation state change

17. Oxidative addition & Vaska's complex
18. Reductive elimination
19. Reductive Elimination
20. Oxidative coupling with C-C bond formation
21. Metathesis reactions

1. Complete the following equations giving the structure and electron count of the organometallic products
   A. $MgBr_2$ + K (metal) -(THF solvent reflux) ⟶
   B. MeCl + NaPb ⟶

2. Suggest suitable methods for the preparation of

   (a) $HCo(CO)_4$
   (b) $Na_2[Fe(CO)_4]$
   (c) $[CpRe(NO)(CH_2)(CO)]^+$

3. $CpCo(CO)_2$ is a catalyst for synthesis of dimethylphthalate from acetylene and dimethylacetylene dicarboxylic acid. Why is dimethylphthalate the only product?

4. Give an example of ring opening metathesis reaction using a suitable catalyst. How will you prevent polymerization in the a ring opening reaction using a metathesis catalyst?

5. How will you maximise the formation of 1,5-hexadiene in the following reaction promoted by a metathesis catalyst ?

   (a) cyclobutene and ethylene.
   What are the possible side products?