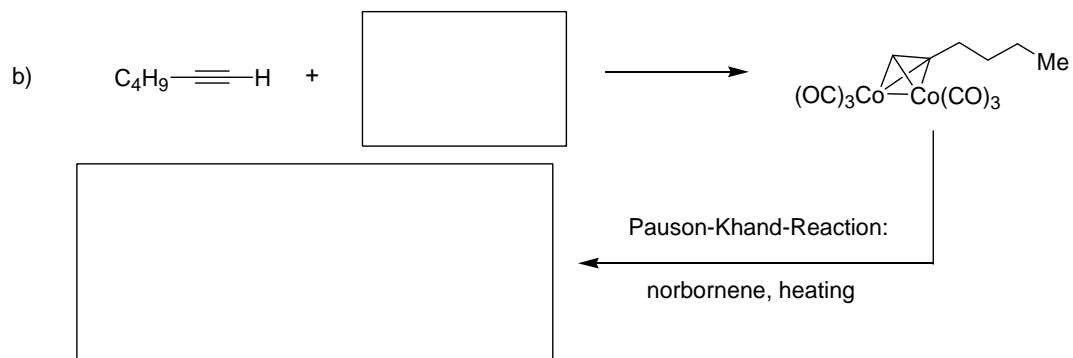
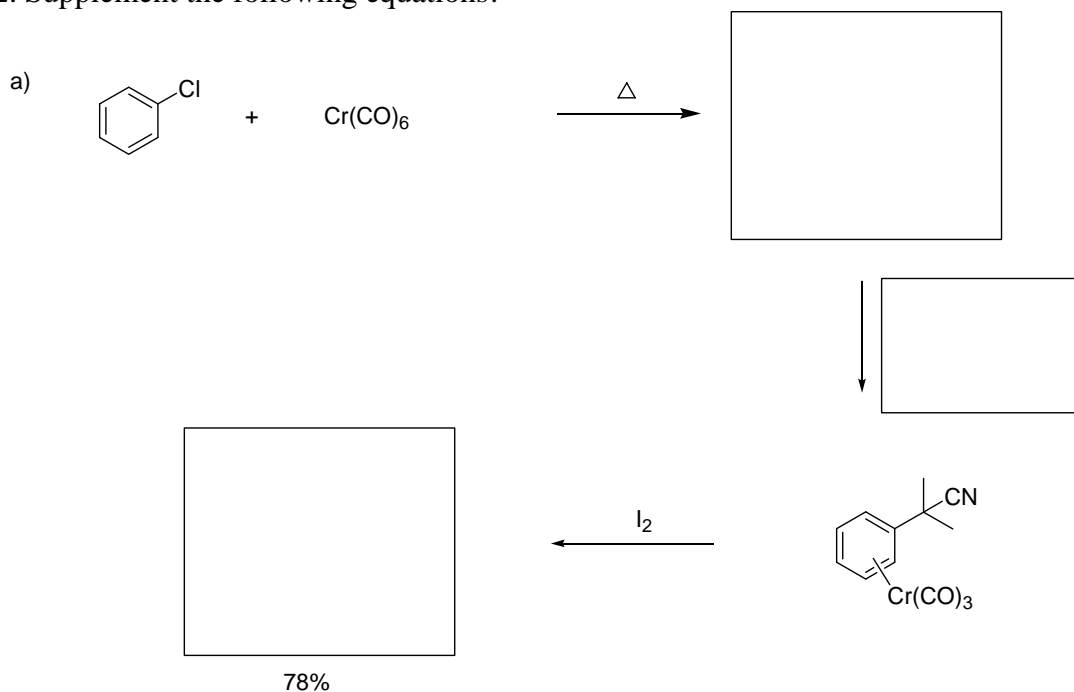


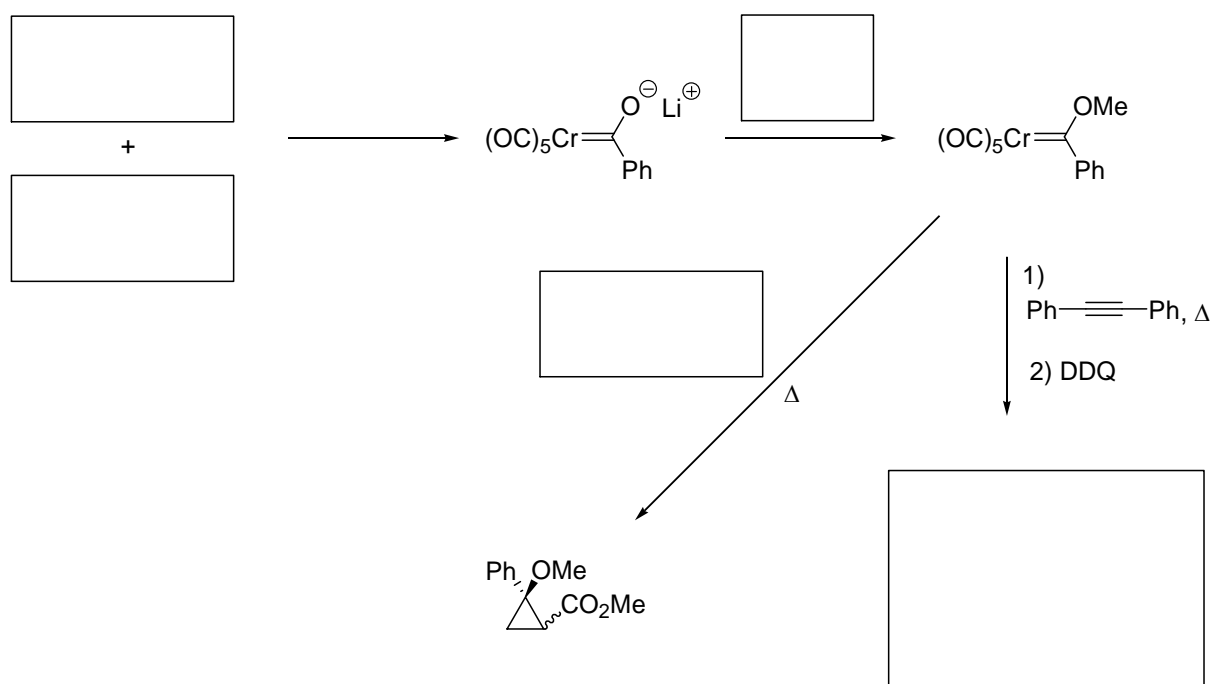
**Problem Set No. 8 (14.1.2013)**

1. Starting with 3 equivalents of cyclopentadiene and ethylmagnesium bromide the corresponding cyclopentadienyl salt is formed and subsequently treated with  $\text{FeCl}_3$  (Pauson, 1951). The resulting product is ferrocene. Draw the structure of ferrocene and design a more economic synthesis of ferrocene using sodium hydride as base and  $\text{FeCl}_2$ !

2. Supplement the following equations!



3. Supplement the following sequence involving a Fischer carbene complex!



4. a) Suggest a synthetic pathway for the synthesis of an alkoxy-substituted Fischer carbene complex with a cyclohexenyl substituent at the carbene carbon!
- b) Perform a Dötz-reaction of this complex with 1-hexyne (oxidative work-up) and explain the regiochemistry of this reaction!
- c) React the carbene complex with piperidine to provide an amino carbene complex, suggest a mechanism!

5. The reaction of  $\text{Cp}_2\text{TiCl}_2$  with 2 equivalent of MeLi generates the Petasis reagent! By heating this compound with methyl hexanoate an enol ether is formed, which can be hydrolyzed to a methyl ketone! Write down the equation for these transformations without mechanism. What is the active species generated from Petasis reagent?