

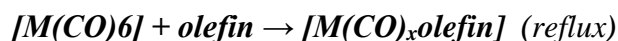
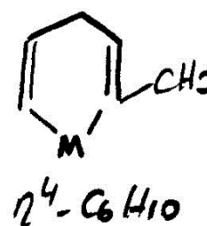
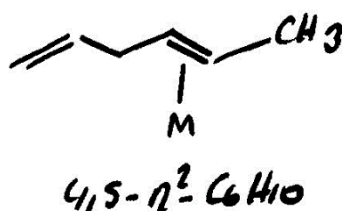
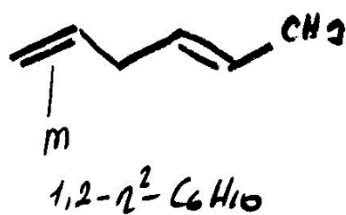
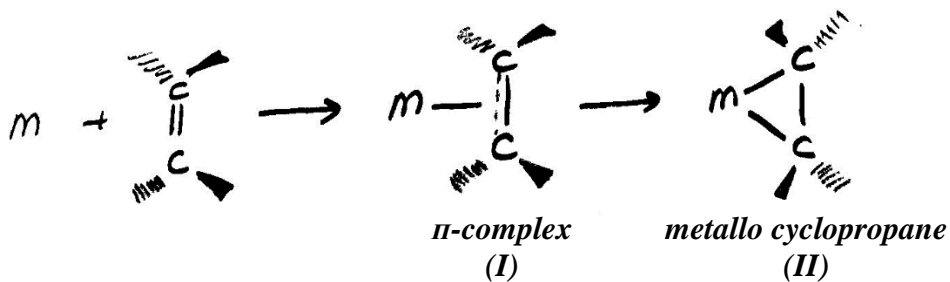
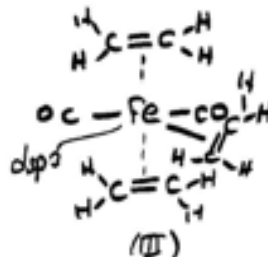
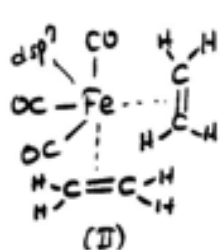
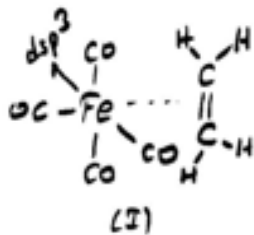
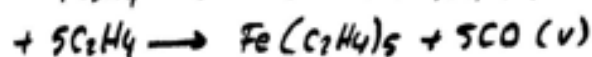
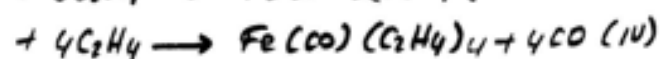
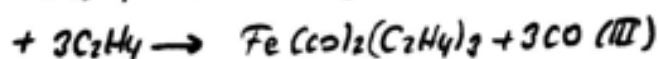
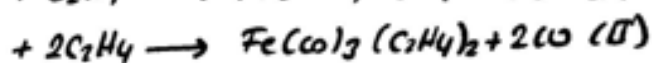
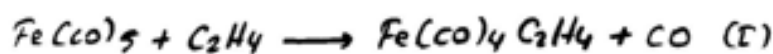
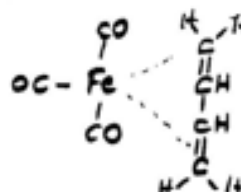
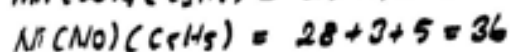
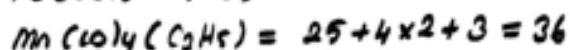
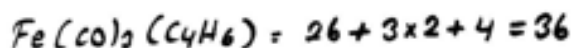
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CHM0308 INORGANIC CHEMISTRY II

18 ELECTRON RULE [EFFECTIVE ATOMIC NUMBER (EAN) RULE]

OLEFIN COMPLEXES

The olefins, such as ethylene, butadiene, may replace with CO in the carbonyl complexes.

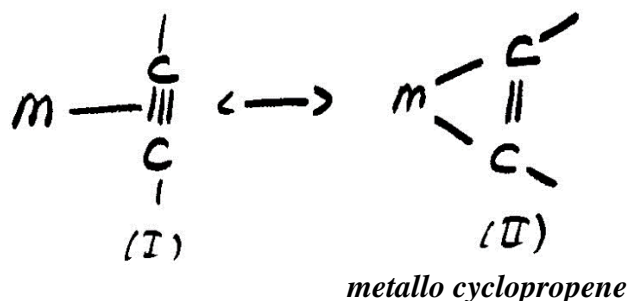


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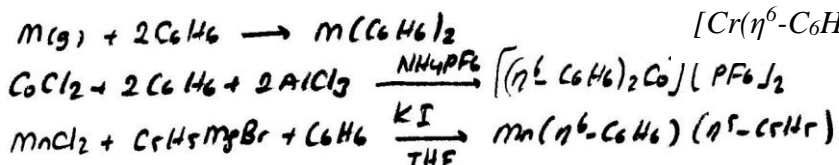
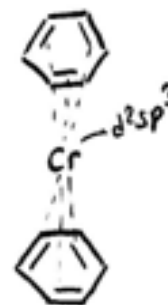
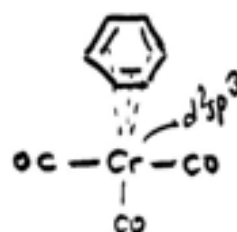
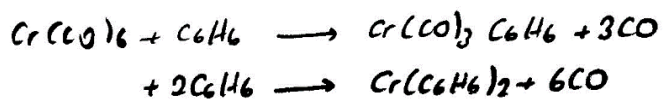
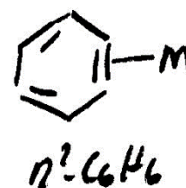
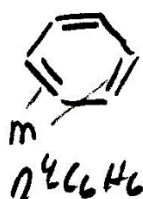
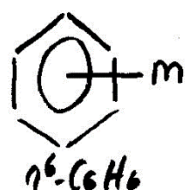
ALKYNE COMPLEXES

The behavior of alkynes as a ligand is similar to that of the alkenes.



ARENE COMPLEXES

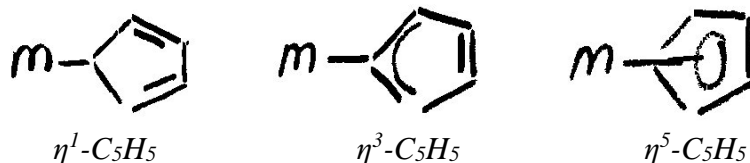
Benzene can bind to transition metals in three ways:



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CYCLOPENTADIENYL COMPLEXES

Cyclopentadienyl (Cp, C₅H₅) ligand can bind to the metal atom in three ways: From one carbon (η^1 -), three carbons (η^3 -) and five carbons (η^5 -).



The first complex synthesized with the cyclopentadienyl ligand is ferrocene [Fe(η^5 -C₅H₅)₂]. The most stable metallocene is ferrocene. All metallocenes except ferrocene are paramagnetic.

Ferrocene [Fe(η^5 -C₅H₅)₂]

Fe: 26e⁻

Fe⁰: 26e⁻

26 + 5x2 = 36e⁻ (Kr)

Fe: 8e⁻

Fe⁰: 8e⁻

8 + 5x2 = 18e⁻



Cobaltosene [Co(η^5 -C₅H₅)₂]

Co: 27e⁻

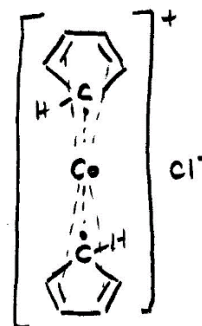
Co⁰: 27e⁻

27 + 5x2 = 37e⁻

Co: 9e⁻

Co⁰: 9e⁻

9 + 5x2 = 19e⁻



Because it has 19e⁻, it is not stable and easily oxidized to form [Fe(η^5 -C₅H₅)₂]⁺.