

CHEM 476 Organometallics Review

- ◆ Be able to use calculate the number of electrons for any compound based on formula
 - Know common ligands, their hapticity, number of electrons donated and charge
 - Predict stability/reactivity based on number of electrons and eighteen-electron rule
 - Basis of eighteen-electron (effective atomic number) rule
 - Explain difference between hapticity (η) and coordination number

- ◆ Nomenclature (use of η , naming organometallic compounds)

- ◆ Backbonding, its effects and how it can be experimentally quantified

- ◆ Tolman cone angle, what it measures and how it is used

- ◆ Chatt-Dewar-Duncanson model of π -donors

- ◆ Davies-Green-Mingos rules for nucleophilic substitutions (mechanistic implications)

- ◆ Everything regarding kinetics and mechanism from organic, CHEM 475 and p-chem

- ◆ Understand basic mechanisms and where they can/cannot be used
 - Substitutions (associative vs. dissociative)
 - Insertion
 - Oxidative addition/reductive elimination
 - β -Hydride elimination/olefin insertion

- ◆ Important synthetic methods
 - Synthesis of carbonyls
 - Reactions of carbonyls to give other compounds (substitution by Δ or $h\nu$)
 - Use of organometallics with halides as starting material (AlCl_3 as halide scavenger)
 - Synthesis of arenes
 - Synthesis of metal alkyls, aryls, alkenyls, alkynyls
 - Synthesis of carbenes and alkylidenes (also know difference between them)

- ◆ Other important terms to know definitions of
 - agostic interaction
 - coordinatively saturated/unsaturated (use to predict reactivity)
 - procatalyst
 - metathesis
 - classes of mononuclear Cp compounds
 - ring slip/olefin slip/haptotropic shift

- ◆ Given a catalytic cycle you should be able to identify what reactions are occurring at any step and be able to draw mechanism