

Ch 4 Study of Chemical Reactions

Note Title

9/21/2005

Mechanism: step-by-step pathway from reactants to products

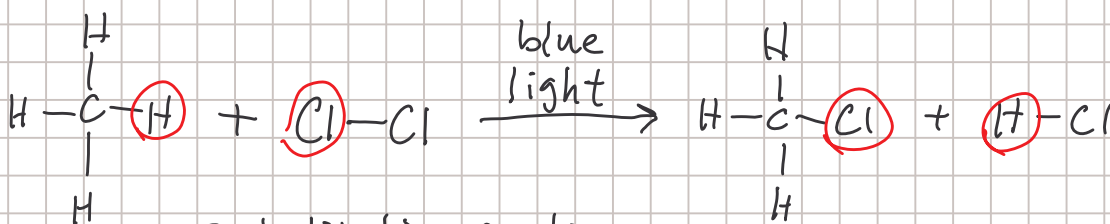
Thermodynamics: energetics & stabilities of reactants, intermediates, and products
AT equilibrium

Kinetics: reaction rates, concentrations of reactants & intermediates
stabilities of transition states

Reaction-energy diagram

Tracks energy along entire mechanism

Chlorination of methane

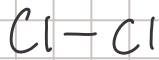


Substitution reaction

2 atoms switch places

only a few photons of blue light are needed!

photon starts a chain-reaction



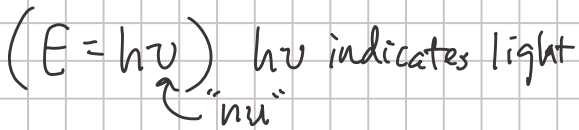
the Cl-Cl bond is quite weak.

Cl₂ gas is yellow (blue light is absorbed)

Single-headed arrow: motion of a single electron



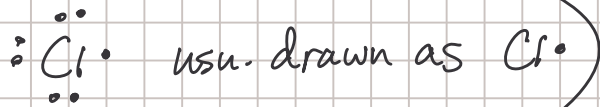
chlorine radicals



odd # electrons
chlorine
(free radical)

(chlorine atom)

unstable on own



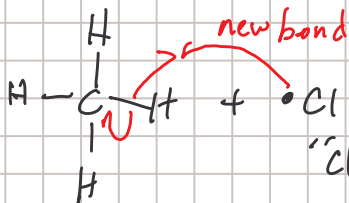
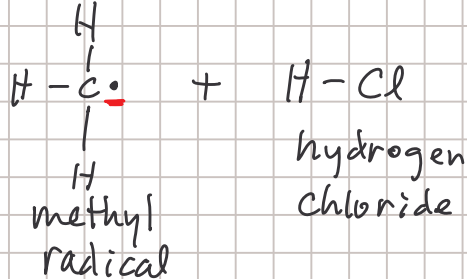
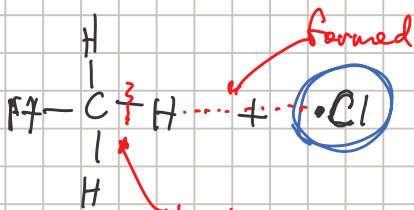
electron deficient
(lack octet)



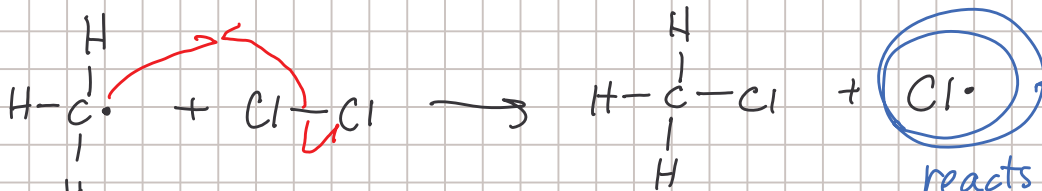
The Initiation step

(formation of Cl·)

Propagation steps - cause reaction to proceed

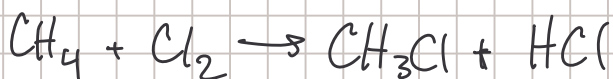
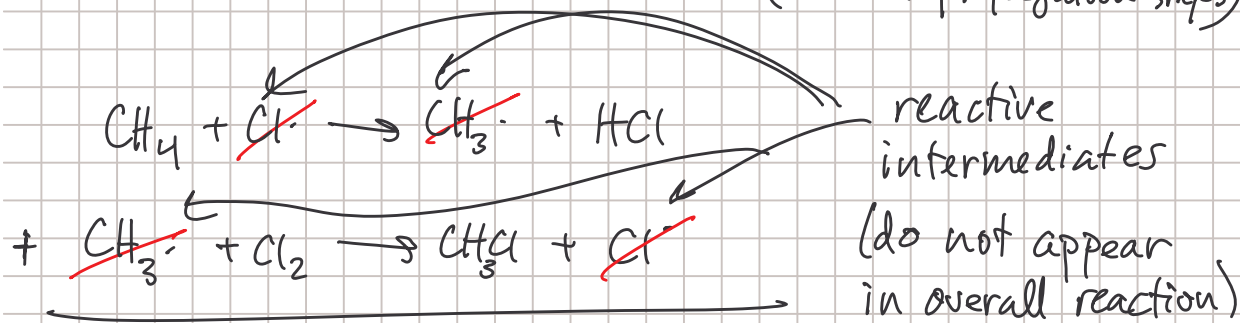
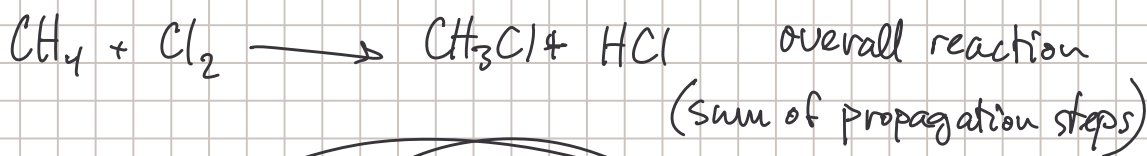


"chlorine radical extracts a hydrogen"

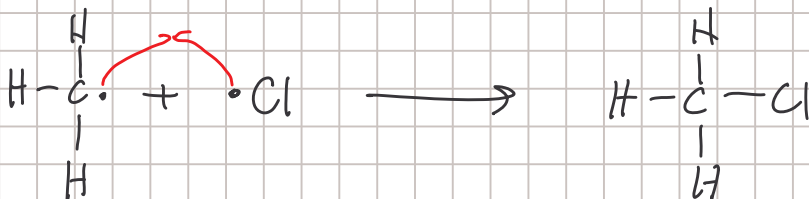


"methyl radical extracts a chlorine"

reacts w/ a new Cl₂ chain to continue reaction



Termination radicals combine



Free-radical chain reaction

