Reactions and the Catalysts needed for such reactions as well as the conditions in terms of pressure and temperature

***Cracking:***

Alkane +heat= alkene +alkane OR alkene +alkane +hydrogen

Conditions for Reaction: Aluminum oxide and chromium oxide 500 Centigrade

***Addition reaction of ethane and steam to form ethanol:***

X-ene + steam= X-anol

Conditions for reaction: Phosphoric acid catalyst, 300centigrade 60 ATM

***Obtaining Hydrogen from methane for use in Haber’s process:***

Methane + steam= hydrogen+ carbon monoxide

Carbon monoxide + steam= hydrogen + carbon dioxide

Left over steam is reduced by the reducing agent carbon monoxide

Conditions for reaction: nickel catalyst, 750 centigrade, 30 ATM

***Haber’s Process:***

Nitrogen + hydrogen (ratio 1:3)= ammonia

Conditions for reaction: Finely divided iron catalyst 450 centigrade 200 ATM

***Contact Process (formation of Sulfur trioxide):***

Sulfur dioxide + oxygen= sulfur trioxide

Conditions for reaction: vanadium pent oxide catalyst, 450 centigrade

***Oxidation of Ethanol to form Ethanoic acid:***

Ethanol + oxygen = ethanoic acid + water

Conditions for reaction: It’s not exactly a catalyst but the reaction needs an oxidizing agent for ethanol to oxidize. Potassium dichromate can be used as it is a oxidizing agent, and during the reaction the potassium dichromate turns from yellow to green.

***Esterification:***

X-oic acid + Y-anol = Y-yl X-anoate

EG: Butanoic acid + heptanol= heptyl butanoate

Conditions for reaction: A few drops of concentrated Sulfuric acid as a catalst

***Halogenation (formation of chloroethane, dichloroethane..etc)***

Alkane + Chlorine radicals = chloroalkane + hydrogen chloride(HCl)

Conditions for reaction: To obtain chlorine radicals lead tetra-ethyl can be used, or UV rays are used.

That’s all I’ve got for now. If you have any similar additions it would be much appreciated.