| **Combustion** | **Substitution** |
| --- | --- |
| CH4(g) + 2O2 (g)  → CO2 (g) + 2H2O(l) | C3H8 + Br2 🡪 C3H7Br + HBr |
| C3H8(g) + 5O2(g) → 3CO2(g) + 4H2O(l) |  |
| Stoichiometry - Wikipedia |  |
| A halogen reacts with a saturated hydrocarbon | Similar to single replacement reactions |
| **Esterification** | **Addition** |
|  |  |
|  | **https://lh4.googleusercontent.com/cDsMIAzlMIA_mOpKdE5f8vbakC0z7dGxPLLGWoTXZEfgUf33F2AzsXNtZEKztpvJmETwybZ8jlKMPiUCwzLIM-fhCurl5geK8XGN1HNzWAoE25gYc9_jGzXIdJYCmZtCDD5IkgPM** |
| C2H5OH + CH3COOH 🡪 CH3COOC2H5 + H2O | C3H6 + F2 🡪 C2H6F2 |
| Alcohol + Acid 🡪 Ester + Water | Similar to synthesis reactions |
| Creates a great smelling organic compound | A halogen reacts with an unsaturated hydrocarbon |
| **Polymerization** | **Fermentation** |
| chemical reaction - Polymerization reactions | Britannica |  |
|  |  |
| Creates plastics, nylon, rubber, Kevlar, teflon, and other materials | Saccharomyces cerevisiae use and function in alcohol production -  microbewiki Saccharomyces cerevisiae use and function in alcohol production -  microbewiki |
| Small unsaturated hydrocarbon chains form long saturated hydrocarbon chains | Sugar breaks down into alcohol and carbon dioxide |
| **Saponification** | **Cracking** |
|  |  |
|  |  |
| https://steemitimages.com/640x0/https:/jenmcintyre.files.wordpress.com/2008/04/howsoapworks_page_4.png | Long hydrocarbons break down into smaller hydrocarbon chains |
| Creates a soap that has both nonpolar chains (to clean nonpolar solutes) and ionic portion (to clean ionic and polar solutes) | Similar to decomposition reactions |