

### Alkanes

#### Source

- Crude oil
- Separated by fractional distillation

#### Reactions

- Complete combustion
- Incomplete combustion (CO, C, CO<sub>2</sub> and H<sub>2</sub>O)

#### Substitution reaction

- Halogens substitute hydrogen from alkanes
- Happens only in presence of UV light

### Alkenes

#### Source

- Prepared by cracking
- 500°C in presence of catalyst (Aluminum trioxide and silicone dioxide)
- 1000°C when no catalyst

#### Reactions

- Complete combustion
- Incomplete combustion (CO, C, CO<sub>2</sub> and H<sub>2</sub>O)

#### Addition reaction

- Small molecule added to alkene to produce larger molecule with no bi-products
- Happens due to carbon to carbon double bond

#### Addition of Hydrogen

- Reagent: H<sub>2</sub>
- Conditions: Nickel (Ni) and 170°C
- Product: Alkane
- Application: Used in margarine industry (obtain margarine from plant oil)

#### Addition of water/steam

- Reagent: Water
- Conditions: Phosphoric acid (H<sub>3</sub>PO<sub>4</sub>), 300°C and 60 atm
- Product: Alcohol
- Application: Used in industrial manufacture of ethanol

#### Addition of Halogens

- Reagent: Halogens (Cl<sub>2</sub>, Br<sub>2</sub> and I<sub>2</sub>)
- Conditions: none

### Alkenes (cont)

- Application: Used as identification test for alkenes (Pass the compound through aqueous bromine. If compound is an alkene, bromine colour changes from brown to colourless)

