

Fuels

crude oil:

complex mixture of hydrocarbons: compounds containing carbon / hydrogen only
containing molecules in which carbon atoms are in chains or rings
important source of useful substances – fuels / feedstock for petrochemical industry
Non-renewable

Fractional distillation: separation of crude oil into more simple/useful mixtures

Viscous crude oil pumped in
Heated & vaporised
Bitumen leaves as liquid: too high boiling-point / longest carbon chain / most viscous
Fractions condense just below their boiling point and are carried out at different levels – separated

uses

Gases: domestic heating/cooking
Petrol: Fuel for cars
Kerosene: fuel for aircraft
Diesel oil: fuel for cars/trains
Fuel oil: fuel for large ships & power stations
Bitumen: surfacing roads/roofs

Differences between hydrocarbon's fractions – determined by intermolecular forces holding chain together

Viscosity: longer is thicker – stronger force between hydrocarbon molecules – harder for liquid to flow

Flammability: shorter is easier to ignite

Boiling-point: shorter is lower – intermolecular forces of attraction in long molecules are harder to break

Length of chain / amount of carbon atoms: increase – more atoms moving together – heavier

homologous series: series of compounds

same general formula: C_nH_{2n+2}

Consecutive compounds differ by CH_2 in molecular formulae

Physical properties: gradual variation

chemical properties: similar

complete combustion of hydrocarbon: produces carbon dioxide & water

Energy given out – exothermic

incomplete combustion of hydrocarbons: produces carbon & carbon monoxide

When hydrogen burned in limited supply of oxygen

Product has less oxygen than carbon dioxide: carbon monoxide

Carbon – soot form