

Carbon monoxide as a fuel

Energy is recovered from the hot waste gas from the catalyst regenerator in two ways:

- the hot gases are used physically to turn a turbine to generate electricity; and
- the carbon monoxide is burnt as a fuel ($\Delta H_c(\text{CO}) = -283 \text{ kJ mol}^{-1}$).

Desulfurisation

Crude oil contains sulfur in the form of hydrogen sulfide and various organosulfur compounds. Sulfur is removed from crude oil fractions by first reacting the fraction with hydrogen to convert all the sulfur to hydrogen sulfide. Hydrogen sulfide is then separated from other process gases using solvents. After stripping the hydrogen sulfide from the solvents it is burnt in air under controlled conditions to yield elemental sulfur and water. The process is called hydrodesulfurisation.

The recovered sulfur is sold as the starting material for the manufacture of sulfuric acid – see the notes for that process.

Flare stacks

All processes in an oil refinery have pressure relief valves, to protect equipment from high pressures, and pressure control valves, which allow excess gas to be removed from the process. Flammable gases from these valves are normally collected and burnt to recover their energy. Any excess gases are led to a flare stack at the top of which is a gas-burning 'pilot light' which ensures that the released gases ignite and are burnt.