

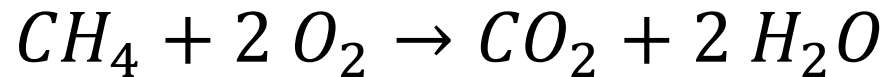


Enthalpy of Reaction

How many liters of methane must be burned to produce 1 kg of cement (CaO)? The cement reaction is:



The combustion of methane is:



The thermodynamic data are:

$$\Delta_f H^\circ(CO_2) = -393.5 \text{ kJ/mol}$$

$$\Delta_f H^\circ(H_2O) = -286 \text{ kJ/mol}$$

$$\Delta_f H^\circ(CH_4) = -74.9 \text{ kJ/mol}$$

$$\Delta_f H^\circ(CaO) = -634.9 \text{ kJ/mol}$$

$$\Delta_f H^\circ(CaCO_3) = -1207.9 \text{ kJ/mol}$$