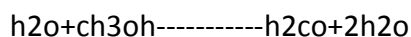# Answer on the question #49010, Chemistry, Physical Chemistry

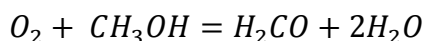**Question:**

use bond energies to estimate delta h for the following reaction:

h2o+ch3oh-----------h2co+2h2o

Solution:

The reaction seems to be strange, as water is present in the both sides of the equation. I suppose that this process passes this way:

$$O_2 + CH_3OH = H_2CO + 2H_2O$$

The enthalpy is the difference between the sums of the bond energies of reagents and products:

$$\Delta H = \sum reag - \sum prod$$

$$\Delta H = b(O-O) + 3*b(C-H) + b(O-H) + b(C-O) - 2*b(C-H) - b(C=O) - 4*b(O-H)$$

$$\Delta H = b(O=O) + b(C-H) + b(C-O) - b(C=O) - 3*b(O-H)$$

$$b(O-H) = 467\frac{kJ}{mol}, \quad b(C=O) = 745\frac{kJ}{mol}$$

$$b(C-O) = 358\frac{kJ}{mol}, \quad b(C-H) = 413\frac{kJ}{mol}$$

$$b(O=O) = 495\frac{kJ}{mol}$$

$$\Delta H = 495 + 413 + 358 - 745 - 3*467 = -880\frac{kJ}{mol}$$

Answer: -880 $\frac{kJ}{mol}$.