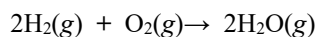


For the Reaction:



Estimate the enthalpy of reaction, using the bond energy values.

Bond Energies per mole of bonds is always positive.  
(defined as endothermic energy to break bond)

H-H	432 kJ
H-O	467 kJ
O=O	495 kJ

Reactants Bonds Broken		Products Bonds Formed	
H-H	432 kJ	H-O-H	-467 kJ
H-H	432 kJ		-467 kJ
O=O	495 kJ	H-O-H	-467 kJ
			-467 kJ
Total	1359 kJ	Total	-1868 kJ
Estimated Net Change in Enthalpy			
$\Delta H_{\text{rxn}} = -509 \text{ kJ} / \text{mol}_{\text{rxn}}$ (meaning 2 mol $\text{H}_2\text{O}(\text{g})$ )			

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Alternately this equation will work also since it will assign the negative sign to the products.

$$\Delta H_{\text{rxn}} = \Sigma \text{Bond energy reactants} - \Sigma \text{Bond energy products}$$

$$\Delta H_{\text{rxn}} = (432 \text{ kJ} \times 2 + 495 \text{ kJ}) - (467 \text{ kJ} \times 4)$$

$$\Delta H_{\text{rxn}} = -509 \text{ kJ for the reaction } 2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$$

Bond energies are estimated, and this will be an approximate value.