Quiz 10.4 – Bond Enthalpies

Name: Key

**Problem 1 (4 points)**

Give the approximate $\Delta H_{rxn}$ for this reaction: $N_2(g) + O_2(g) \longrightarrow 2\,NO(g)$

You may need to use the following values

Average Bond Enthalpies

| Compound | $\Delta H_{Bond}\left(\frac{kJ}{mol}\right)$ | Compound | $\Delta H_{Bond}\left(\frac{kJ}{mol}\right)$ | Compound | $\Delta H_{Bond}\left(\frac{kJ}{mol}\right)$ |
|---|---|---|---|---|---|
| O=O | 498 | O–O | 142 | | |
| N–N | 240 | N=N | 418 | N≡N | 941 |
| N–O | 200 | N=O | 607 | | |

Bonds Broken

N≡N O=O

Bonds Formed

2 · N=O

$\Delta H_{rxn} = 941\ kJ/mol + 498\ kJ/mol - 607\ kJ/mol = 225\ kJ/mol$

**Problem 2 (1 point)**

Briefly explain why this value is only an *approximation* of the true value

Bond strength is affected by the local environment, so not every N=O bond has the same enthalpy. Values in this table are only averages taken from a slate of representative molecules.