OTHS Pre-AP Chemistry

**Practice #5: Heat of Formation**

(See Video #5)

*Use standard heats of formation, ΔHf °, from the back of this packet to find the* change in enthalpy*, ΔH, a.k.a. heat of reaction. Then classify each reaction as exothermic or endothermic.*

1. CO(g) 🡒 2 C(s) + O2(g)

1. 2H2O2 (l) 🡒 2H2O (l) + O2(g)
2. 4 NO (g) + 6 H2O (g) 🡒 4 NH3 (g) + 5 O2 (g)
3. HCl (g) + NaOH (s) 🡒 NaCl (s) + H2O (l)
4. 2H2S (g) + 3O2 (g) 🡒 2H2O(g) + 2SO2 (g)
5. 2C2H6 (g) + 7O2 (g) 🡒 4CO2 (g) + 6H2O (l)
6. 2C2H2 (g) + 5O2 (g) 🡒 4CO2 (g) + 2H2O (l)
7. CaCO3 (s) 🡒 7 CaO(s) + CO2 (g)
8. The following is known as the thermite reaction: 2Al (s) + Fe2O3 (s) 🡒 Al2O3 (s) + 2Fe (s)

Find the heat of reaction for the thermite reaction. The thermite reaction is highly exothermic. Does your answer support this information?

**Standard Heats of Formation ΔHfo (kJ/mol)**

|  |  |
| --- | --- |
| **Chemical** | **ΔHfo (kJ/mol)** |
| AlCl3 | -705.63 |
| Al2O3 | -1669.8 |
| Al2(SO4)3 | -3440 |
| BaCl2 | -858.6 |
| BaCO3 | -1213 |
| Ba(OH)2 | -944.7 |
| BaO | -548.1 |
| BaSO4 | -1473.2 |
| BeO | -609.4 |
| BCl3 | -402.96 |
| CaCO3 | -1207.6 |
| CaCl2 | -877.3 |
| Ca3(PO4)2 | -4132 |
| CaF2 | -1219.6 |
| Ca(OH)2 | -1002.82 |
| CaO | -635.09 |
| CaSO4 | -1434.52 |
| CaS | -482.4 |
| C2H4 (g) | 52.26 |
| CH4 | -74.87 |
| CO | -110.5 |
| CO2 | -393.5 |
| C2H5OH (l) | -277.7 |
| Cl2 | 0 |
| F2 | 0 |
| H2 | 0 |
| H2O (g) | -241.818 |
| H2O (l) | -285.830 |
| H2O2 | -187.8 |
| H3PO4 | -1288 |
| HCN | +130.5 |
| HBr | -36.3 |
| HCl | -167.2 |
| FeCl3 | -399.5 |
| FeO | -272 |
| Fe2O3 | -826 |
| FeS | -95 |
| FeS2 | -178 |
| FeSO4 | -929 |
| MgCO3 | -1095.797 |
| MgCl2 | -641.8 |
| Mg(OH)2 | -926.8 |
| MgO | -601.24 |
| MgSO4 | -1278.2 |
| HgO | -90.83 |
| NH3 | -80.8 |
| NH4Cl | -314.55 |
| NO2 | 33.2 |
| N2O | 82.05 |
| NO | 90.29 |
| N2O4 | 9.16 |
| O2 | 0 |
| PCl3 | -320 |
| PCl5 | -440 |
| PbO2 | -277 |
| Pb(NO3)2 | -452 |
| PbSO4 | -920 |
| KBr | -392.2 |
| KClO3 | -391.4 |
| KCl | -436.68 |
| KF | -562.6 |
| KClO4 | -430.12 |
| AgBr | -99.5 |
| AgCl | -127.01 |
| AgI | -62.4 |
| Ag2O | -31.1 |
| Ag2S | -31.8 |
| Na2CO3 | -1130.77 |
| NaCl | -411.0 |
| NaF | -569.0 |
| NaOH | -469.15 |
| NaNO3 | -446.2 |
| Na2O | -414.2 |
| H2S | -20.63 |
| SO2 | -296.84 |
| H2SO4 | -814 |
| TiO2 | -944.7 |
| ZnCl2 | -415.1 |
| ZnO | -348 |