Name Date

Worksheet 15.1: Entropy and spontaneity

**1** Fill in the following table, stating whether there is an increase or decrease in entropy and giving a reason for this.

|  |  |  |
| --- | --- | --- |
| **Reaction** | **Increase or decrease in entropy?** | **Reason** |
| ice → water |  |  |
| C2H4(g) + H2(g) → C2H6(g) |  |  |
| 2C2H6(g) + 7O2(g) → 4CO2(g) + 6H2O(l) |  |  |
| N2O4(g) → 2NO2(g) |  |  |
| NH3(g) + HCl(g) → NH4Cl(s) |  |  |
| 2C(s) + O2(g) → 2CO(g) |  |  |

**2** Using data in the table, calculate the entropy for the following reaction:

N2(g) + 3H2(g) → 2NH3(g) at 298 K

|  |  |
| --- | --- |
|  | **S° / J K−1 mol−1** |
| N2 | 192 |
| H2 | 131 |
| NH3 | 192 |

**3** Using data in the table provided, calculate D*S* for the following reaction and comment on the   
value obtained:

C2H4(g) + H2(g) → C2H6(g)

|  |  |
| --- | --- |
|  | ***S*°/ J K−1 mol−1** |
| C2H4(g) | 201 |
| H2(g) | 131 |
| C2H6(g) | 230 |