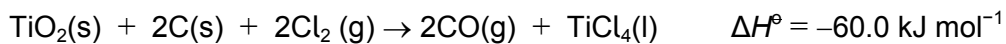


**0 5**

Titanium(IV) chloride can be made from titanium(IV) oxide as shown in the equation.

**0 5 . 1**

Some entropy data are shown in **Table 3**.

**Table 3**

Substance	TiO <sub>2</sub> (s)	C(s)	Cl <sub>2</sub> (g)	CO(g)	TiCl <sub>4</sub> (l)
S° / J K <sup>-1</sup> mol <sup>-1</sup>	50.2	5.70	223	198	253

Use the equation and the data in **Table 3** to calculate the Gibbs free-energy change for this reaction at 989 °C

Give your answer to the appropriate number of significant figures.

Use your answer to explain whether this reaction is feasible.

**[6 marks]**

Gibbs free-energy change \_\_\_\_\_ kJ mol<sup>-1</sup>

Explanation \_\_\_\_\_

\_\_\_\_\_

**6**