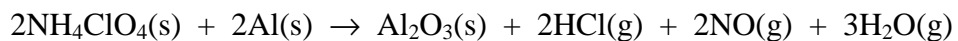


- Ammonium perchlorate mixed with powdered aluminium powers the space shuttle booster rockets:



Given the following thermochemical data, how much heat would be released per gram of Al(s)?

$$\Delta H_f^\circ (\text{H}_2\text{O}(\text{l})) = -285.1 \text{ kJ mol}^{-1}$$

$$\Delta H_f^\circ (\text{NO}(\text{g})) = 90.4 \text{ kJ mol}^{-1}$$

$$\Delta H_f^\circ (\text{HCl}(\text{g})) = -92.3 \text{ kJ mol}^{-1}$$

$$\Delta H_f^\circ (\text{Al}_2\text{O}_3(\text{s})) = -1669.8 \text{ kJ mol}^{-1}$$

$$\Delta H_f^\circ (\text{NH}_4\text{ClO}_4(\text{s})) = -290.6 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{vap}}^\circ (\text{H}_2\text{O}) = 44.1 \text{ kJ mol}^{-1}$$

Marks
3

Answer:

THE REMAINDER OF THIS PAGE IS FOR ROUGH WORKING ONLY.