**Entropy change**

**2019**

Ammonia reacts with oxygen according to the equation below.



Justify, in terms of the entropy changes of the system and surroundings, why the reaction is spontaneous.

**2018**

The dissolving of ammonium chloride in water is an endothermic process, but ammonium chloride readily

dissolves in water



Justify, in terms of the entropy changes of the system and the surroundings, why ammonium chloride readily dissolves in water.

**2017**

(a) The reaction for the complete combustion of hydrazine is shown in the equation below.

N2H4(l) + O2(*g*) → N2(*g*) + 2H2O(*g*)

This is an exothermic reaction. Explain the entropy changes associated with this reaction.

(b) Explain why the sublimation of iodine is spontaneous, even though the enthalpy of sublimation is a positive value.

**2016**

The equation for the evaporation of liquid methanol is:

CH3OH(l) → CH3OH(*g*)

Explain the entropy changes of the system and surroundings for the evaporation of methanol.

**2014**

(a) Ammonium nitrate is used in ‘cold packs’ to relieve symptoms of a sports injury. The dissolving of the

solid crystals of ammonium nitrate (shown in the equation below) is spontaneous, despite being

endothermic.

NH4NO3(*s*) → NH4+(*aq*) + NO3¯(*aq*)

Explain why this is so, in terms of the entropy change for the reaction system.

(b) Ammonium nitrate dissociates in an endothermic reaction, as shown in the equation below.

NH4NO3(*s*) → NH3(*g*) + HNO3(*g*)

Below is a table outlining four statements about changes in entropy that may occur during any reaction.

Tick () to the left of any statement that is correct for the above reaction. Justify your choice(s).



**2013**

Hydrazine is often used as a rocket fuel.

When liquid hydrazine undergoes combustion, it forms nitrogen and water:

N2H4(*ℓ*) + O2(*g*) → N2(*g*) + 2H2O(*g*) Δc*H*°( N2H4 (*ℓ*)) = –624 kJ mol–1

Explain why liquid hydrazine readily burns in oxygen. Your answer should consider both enthalpy and

entropy changes

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