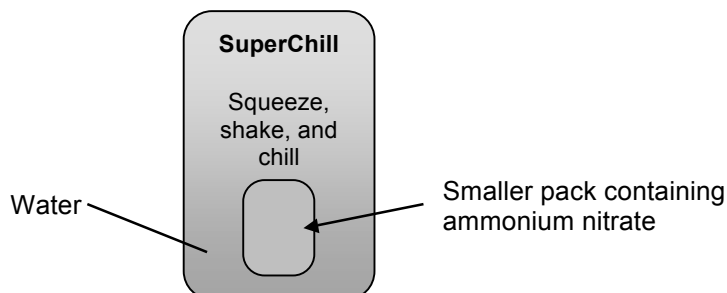


- 1 SuperChill is a type of cooling pack filled with water. Inside the pack is a smaller pack containing solid ammonium nitrate.



The outer pack is squeezed so that the inner pack breaks open. The pack is shaken and quickly gets cold as the ammonium nitrate dissolves in the water. The reaction is not reversible. The packs are made of plastic.

Why does the bag feel cold?

Takes in heat energy from the surroundings or energy transferred from the surroundings to the pack. [1mark]

Reaction is endothermic. [1mark]

The reaction of ammonium nitrate with water is a common example of an endothermic reaction. A common point of confusion is that if the reaction takes in heat energy, it should feel hotter. In fact it feels cooler to the touch, because heat energy is being drawn away from your skin, leaving it feeling cooler.

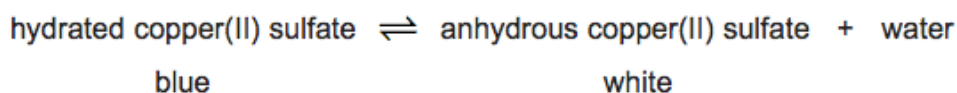
- 1 (a) (i) Suggest one disadvantage of using a type of cooling pack such as SuperChill.

Not reusable/thrown away once used/plastic might be non-biodegradable/uses non-renewable resource/crude oil. [1 mark]

(1 mark)

(Total 3 marks)

- 2 (a) The equation below represents the reaction of blue hydrated copper sulfate crystals when they are heated.



- 2 (a) (i) What does \rightleftharpoons tell you about the reaction?

(The reaction is) reversible [1 mark]

(1 mark)

Energy Transfer in Reactions

2 (a) (ii) When 10g of blue copper sulfate crystals is heated, 400 joules of energy are taken in from the surroundings.

What is name of the type of reaction that takes in heat energy from the surroundings?

Endothermic [1 mark]

(1 mark)

2 (a) (iii) Describe the energy change when an excess of water is added to the anhydrous white copper sulfate.

Energy is transferred to the surroundings or energy is transferred from the anhydrous copper sulfate to the surroundings or heat energy/heat is given off.
[1 mark]

The reaction is exothermic. [1 mark]

(2 marks)

(Total 4 marks)