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Endothermic reaction disposal of products

Posted by Anonymous on Fri, 2017-08-25 11:00

Endothermic reaction disposal of products: How can I dispose of the products of the reaction between Ammonium thiocyanate and barium hydroxide?

Thanks

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7

8

9

10

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Laboratory Technicians

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Endothermic reaction disposal of products

Submitted by sat on 13 September 2017

When solid ammonium thiocyanate is reacted with solid barium hydroxide it produces barium thiocyanate, ammonia and water¹.



This is an interesting endothermic solid-solid reaction which is probably best carried out as a demonstration so that the temperature change can be clearly observed¹.

Some publications say to wash the products all to waste², however without knowing the quantity you need to dispose of and that we are considering barium salts and thiocyanate, this requires further consideration.

Barium thiocyanate is classified as a Dangerous Goods class 6.1 Toxic as well as an S6 Scheduled Poison³. The thiocyanate anion is hazardous to the aquatic environment.

If the reaction is carried out infrequently as a demonstration, then washing the products down the sink may be acceptable, depending on factors such as the reaction scale and the acceptance limits of the local water authority. If the reaction has been conducted as a class activity, then we suggest that you store the products in a suitably labelled container for disposal by a licenced chemical disposal contractor. See our [School science suppliers list](#) for contact details of some chemical waste disposal contractors.

We recommend that schools consider the use of microscale reactions and techniques in the classroom. If the activity has been conducted on a microscale, then it would be permissible to dispose of the products to waste water.

An alternative to the ammonium thiocyanate reagent is to use ammonium chloride, which gives barium chloride in the reaction with barium hydroxide and thus avoids the hazard of the thiocyanate anion^{4,5}:



Barium chloride is also classified as a Dangerous Goods class 6.1 Toxic as well as an S6 Scheduled Poison⁶. The products of this reaction can be transferred to a suitably labelled container and stored for collection by a licenced waste disposal contractor. Alternatively, the barium ions can be precipitated from solution as barium sulfate by addition of sodium sulfate solution, then collected by filtration and allowed to dry. Small quantities of barium sulfate can be disposed of as general waste; larger quantities should be transferred to a labelled container and stored for collection.

We have previously answered some questions regarding the disposal of thiocyanate: see

- <https://assist.asta.edu.au/question/4116/disposal-ammonium-thiocyanate>
- <https://assist.asta.edu.au/question/3960/chemical-disposal>

Another related Q&A that contains good general advice for chemical waste disposal is [Laboratory Chemicals and Waste Management/Setup](#)

It is important to find out from your local authority regarding what chemical waste is permitted

or not permitted to be disposed of to your waste water system. A previous answer has links to various state authorities: see [organic chemistry](#)

References:

- ¹ "Counting Bonds in a Cool Reaction". 2016. Flinn Scientific website.
<https://www.flinnsci.ca/api/library/Download/cdf5ba6a59ab490cb1cc3b490a151846>
(Accessed August 2017)
 - ² Endothermic Reaction Demonstration. ThoughtCo. Website.
<https://www.thoughtco.com/endothermic-reaction-demonstration-604251> (Accessed August 2017)
 - ³ "Barium thiocyanate Safety Data Sheet". 2015. Sigma Aldrich website.
<http://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=AU&lang...>
(Accessed August 2017)
 - ⁴ "Endothermic solid-solid reactions" Royal Society of Chemistry Website.
<http://www.rsc.org/learn-chemistry/resource/res00000739/endothermic-solid-solid-reactions?cmpid=CMP00005021> (Accessed September 2017)
 - ⁵ 'Endothermic Reactions of Hydrated Barium Hydroxide and Ammonium Chloride' University of California website. <http://www-chem.ucsd.edu/undergraduate/teaching-labs/demos/demo45.html> (Accessed September 2017)
 - ⁶ "Barium chloride Safety Data Sheet". 2014. ChemSupply website.
<https://www.chemsupply.com.au/documents/BL0271CH19.pdf> (Accesses September 2017)
- "Microscale chemistry – what and why?" Scottish Schools Education Research Centre (SSERC) website.
<https://web.archive.org/web/20170930175606/http://www.sserc.org.uk/chemi...> (Original page no longer exists, this page made available through the Internet Archive's Wayback Machine, April 2018)

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