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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

**Voting:**



No votes yet

**Year Level:**

7

8

9

10

Senior Secondary

**Laboratory Technicians:**

Laboratory Technicians

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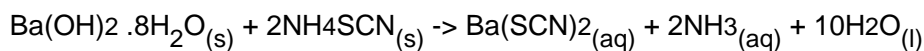
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## Endothermic reaction disposal of products

Submitted by sat on 13 September 2017

*Answer reviewed 27 February 2023*

When solid ammonium thiocyanate is reacted with solid barium hydroxide it produces barium thiocyanate, ammonia and water<sup>1</sup>.



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 observed.<sup>1</sup>

Some publications say to wash the products all to waste,<sup>2</sup> however, without knowing the quantity you need to dispose of and that we are considering barium salts and thiocyanate, this requires further consideration.

The barium thiocyanate product is toxic and harmful to the aquatic environment.<sup>3</sup> If the reaction is carried out infrequently as a demonstration, then washing the products to waste 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.

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:<sup>4,5</sup>



Barium chloride is also classified as toxic as well as an S6 Scheduled Poison.<sup>6</sup> 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.<sup>7,8</sup> Another related Q&A that contains good general advice for chemical waste disposal is [Hazardous waste disposal](#).<sup>9</sup>

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.<sup>10</sup>

## References

<sup>1</sup> Flinn Scientific ChemFax! 2016, *Counting Bonds in a Cool Reaction*. Flinn Scientific website. <https://www.flinnsci.ca/api/library/Download/cdf5ba6a59ab490cb1cc3b490a1...> (Accessed February 2023)

<sup>2</sup> ThoughtCo., 2019, *Endothermic Reaction Demonstration*, ThoughtCo. Website, <https://www.thoughtco.com/endothermic-reaction-demonstration-604251> (Accessed February 2023)

<sup>3</sup> National Library of Medicine, 2023, Compound Summary: Barium thiocyanate hydrate, Pubchem website, <https://pubchem.ncbi.nlm.nih.gov/compound/Barium-thiocyanate-hydrate>

<sup>4</sup> Royal Society of Chemistry, 2023, *Endothermic solid-solid reactions*, RSC Education website, <https://edu.rsc.org/lcredir/learn-chemistry/resource/res00000739/endothe...> (Accessed February 2023)

5 University of California, 2023, *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 February 2023)

6 ChemSupply Australia website, (2023), *Safety Data Sheet: Barium chloride*. Please search the product information page on the website for the current SDS for Barium chloride <https://shop.chemsupply.com.au/>

7 Science ASSIST, 2023, Question: *Disposal of ammonium thiocyanate*, Science ASSIST website, <https://assist.asta.edu.au/question/4116/disposal-ammonium-thiocyanate>

8 Science ASSIST, 2023, Question: *Chemical disposal*, Science ASSIST website, <https://assist.asta.edu.au/question/3960/chemical-disposal>

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