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Disposal of silver nitrate

Posted by Anonymous on Tue, 2015-07-21 11:22

Disposal of silver nitrate solid: I have collected silver nitrate solution in a winchester and decanted it off, ready to evaporate the solution, so that I am left with just the solid waste. When I read the MSDS, it is vague as to the disposal procedure, just saying it cannot be put in with regular waste, nor into the drains. If I have to store it for collection from a company, can you tell me the best way to store the solid waste?

Voting:



Average: 5 (1 vote)

Year Level:

9

10

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

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Disposal of silver nitrate solid

Submitted by sat on 26 July 2015

Answer reviewed 26 February 2023

The silver nitrate waste can be stored in the same kind of container as it is supplied, i.e. a glass reagent bottle. The waste bottle should be stored with other oxidising agents or, alternatively, along with other waste chemicals, but segregated from incompatible chemicals, with secondary containment (i.e., banded).

A note on evaporating waste nitrate solutions

Nitrate salts have the potential to decompose explosively when subjected to heat or shock, some decomposing to give the toxic brown gas, nitrogen dioxide. Contamination of nitrate salts with organic substances (e.g., alcohols) or combustible materials can also be dangerous. Therefore, we advise against the heating of waste nitrate solutions to hasten evaporation.

Recommended treatment of waste silver nitrate solution

A safer alternative to evaporation of the silver nitrate solution is to precipitate the silver as silver chloride by addition of sodium chloride solution, as follows:

1. Prepare a saturated solution of sodium chloride. If you know the concentration and volume of the silver nitrate solution, you can calculate the number of moles of silver in solution. Sodium chloride will react in a 1:1 ratio with the silver ions to give silver chloride. Multiply the number of moles of silver nitrate by 58.44, the molecular weight of sodium chloride. Then multiply this number by 1.5, so that you have an excess of sodium chloride in solution; this will facilitate the precipitation of the silver chloride. Weigh out this amount in grams of sodium chloride and dissolve it in a minimum amount of distilled water. If you don't know how much silver you have in solution, use an excess of a saturated solution of sodium chloride.
2. Slowly and without stirring, add the sodium chloride solution in portions to the silver nitrate solution. With each addition of sodium chloride solution, formation of a white precipitate of silver chloride should be observable until all of the silver has been consumed. (Slow addition of the sodium chloride allows larger particles of the precipitate to form, which makes it easier to collect the solid by filtration). Continue to add the remainder, or an excess, of the sodium chloride solution, and allow the resulting mixture to settle.
3. The silver chloride precipitate can be collected by Büchner filtration or by gravity filtration, dried, and stored for collection by a licenced waste disposal contractor.
4. The filtrate is a solution of sodium nitrate and sodium chloride and can be washed down the sink.

When choosing a waste container, consider the following:

- The type of container should be appropriate for the Dangerous Goods Class of the chemical being disposed of.
- The container should be leak-proof.
- Do not use empty food containers, or household containers for chemical waste.
- Waste containers should have a well-fitting screwcap lid, not a snap-on lid or stopper.
- Never store waste corrosive materials in a metal container.
- If the waste can potentially generate gases during storage, the container must be sealed with a vented cap.

When using old stock chemical containers as waste containers:

- The container should be thoroughly washed, rinsed and dried.
- Ensure that the waste chemical is not incompatible with the original contents of the container (check the SDSs for incompatibilities). The original label should not be removed until the bottle is relabelled as a waste bottle, in order to avoid such incompatibilities.
- Remove the old label before applying the new one; do not just add another label to the bottle.
- Old empty containers which contained substances which are very water-soluble and non-toxic are suitable for use as waste containers.

- Never use the container of an highly toxic chemical as a waste container. These should be stored for collection by a waste disposal contractor.

Labelling waste bottles

The label of a waste bottle should include

- the product identifier (e.g. 'Waste silver nitrate')
- any hazard statements and hazard pictograms consistent with the GHS classification of the chemical.

According to the SafeWork Australia Model Code of Practice on Labelling of Workplace Hazardous Chemicals, if possible, the label of a waste bottle should also include:

- the identity of any known or likely hazardous constituents or impurities and their proportions (for example, 'contains chromium VI, 5%', or 'may contain trace levels of organic peroxides')
- relevant precautionary statements
- relevant first aid and safety directions
- any other information that may assist identification of the hazardous waste and its associated hazards.

Storage of Chemical Waste

- Store the chemical waste according to its hazard, along with other compatible chemicals.
- If you have a separate storage area specifically for chemical waste, secondary containment should be used to segregate incompatible chemicals.
- Chemical waste should not be stored for long periods as the chemicals are unlikely to be pure and therefore their reactivity is unpredictable and as there may be degradation of the waste container. As a general rule, we recommend that chemical waste not be stored for more than one year.

References

'Laboratory Chemical Waste Management' The University of Vermont website
<https://www.uvm.edu/riskmanagement/laboratory-chemical-waste-management>

'Chemical Waste Operating Procedure' July 2019. Sustainability website of the University of Queensland.
https://sustainability.uq.edu.au/files/745/pro_ChmWste.pdf

'Model Code of Practice: Labelling of Workplace Hazardous Chemicals'. July 2020. SafeWork Australia website. [Labelling hazardous chemicals | Safe Work Australia](#)

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