Disposal of agar with silver nitrate

Posted by Anonymous on Thu, 2019-03-28 15:25

Disposal of agar containing silver nitrate: How should I dispose of an agar plate containing silver nitrate? It was used to create crystals with a piece of zinc. (I put 0.8g of agar in 50mL of deionized water with 10mL of 0.1M AgNO3 and divided it into 3 Petri dishes each with a strip of zinc metal.)

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Laboratory Technicians

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Submitted by sat on 28 March 2019

Background:

A more reactive metal will displace a less reactive metal from its compound. The less reactive metal will coat the surface of the more reactive metal.[1] This activity is used to demonstrate a metal displacement reaction between zinc metal and silver ions with the formation of silver crystals. The silver nitrate solution is mixed into molten agar prior to setting in a Petri dish.

Zinc metal is placed into the agar, where the zinc displaces the silver out of the agar. Solid silver crystals form around the zinc metal and a small portion of the solid zinc dissolves into the agar to form zinc ions. This means that you may have both silver and zinc ions in the agar.

Disposal:

- The silver crystals can be scraped off the zinc metal and placed into your heavy metal waste container for collection.
- The zinc metal strip can be cleaned and kept for further use
- The amount of zinc and silver ions in the agar mix would be considered trace amounts and therefore are able to be disposed in general waste.

Science ASSIST recommends the use of microscale techniques, where possible. This has the advantages of reducing the risks involved in certain activities and reducing the production of chemical waste.

An example of a microscale reaction for copper displacing silver from a silver nitrate solution can be seen in the video 'Silver nitrate reacting with copper wire', YouTube (0.20 sec) https://youtu.be/bj1Bjh0VbvU

- Use 1-2 drops of 0.1M silver nitrate on an acetate sheet/plastic sleeve protector
- Place a bare (not coated) copper wire half way into the droplet.
- Watch the development of silver crystals on the copper wire. It could be filmed using a mobile phone with a magnifying lens added.
- The quantity of chemical waste is not significant and can be wiped up with a paper towel or tissue and disposed of in the general waste.

References and further reading

[1] 'Metals', KS3 Chemistry, BBC Bitesize website, https://www.bbc.com/bitesize/guides/zqwmxnb/revision/3 (Accessed March 2019)

'Displacement reactions between metals and their salts', LearnChemistry – Royal Society of Chemistry website, http://www.rsc.org/learn-chemistry/resource/res00000720/displacement-reactions-between-metals-and-their-salts?cmpid=CMP00005017 (October 2015)

'Microscale chemistry', Education in chemistry website, https://eic.rsc.org/feature/microscale-chemistry/2020192.article (March 2007)

'Microscale chemistry revisited', Education in chemistry website, https://eic.rsc.org/feature/microscale-chemistry-revisited/2020193.article (May 2012)
