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Safe concentration of HCl for Year 8 students to use?

Posted by Anonymous on Wed, 2017-08-09 10:23

Safe concentration of HCl for Year 8 students to use?: A year 8 textbook has an activity which includes an example for a colour change (blue litmus paper with HCl added to it). The teacher thinks this is a bit boring and has asked me to look into an alternative colour change reaction. As the 4 examples of a chemical reaction all involved HCl I decided to look for a colour change reaction involving HCl. One of the reactions I am looking at is the reaction of concentrated HCl with $\text{CuSO}_4 \cdot 6\text{H}_2\text{O}$. This gives a lovely colour change from blue to green $[\text{CuCl}_4]^{2-}$. Excess NH_3 solution can then be added to give a lovely deep blue/purple $[\text{Cu}(\text{NH}_3)_4(\text{OH})_2]$.

So far I have been able to get the CuSO_4 solution to change colour to the green $[\text{CuCl}_4]^{2-}$ using 6M HCl (with conc. HCl obviously been approx 12M). I am concerned about the students using 6M HCl. The 6M HCl would be in a Stuhl dropper bottle, it would be in the fumehood and the students would have all their PPE on. Do you think it is safe for the students to do the reaction if closely supervised by myself and the staff member, or should it be a demonstration only? Just out of curiosity, what molarity of HCl would you consider to be safe for students to use?

Can you suggest an alternative colour change reaction involving HCl at a lower concentration?

Voting:



No votes yet

Australian Curriculum:

Chemical change involves substances reacting to form new substances

Year Level:

8

Laboratory Technicians:

Laboratory Technicians

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Submitted by sat on 13 September 2017

Firstly, it is important to assess the risk of each activity conducted considering

- The use of safe operating procedures
- The equipment and how it will be used
- The chemical(s) used, their concentration and how they will be used
- By-products, chemical waste and any other waste produced
- The students' skill-level, behaviour, and ability to follow instructions
- A Risk Assessment Template developed by Science ASSIST can be accessed [here](#)

We recommend that the 6M HCl be used by the teacher as a demonstration only and not by Year 8 students. Science ASSIST considers that up to 2M HCl is sufficient for most general chemistry activities and recommends using the lowest concentration that delivers the desired outcome.

An alternative activity to demonstrate a colour change could be to use another pH indicator, such as universal indicator, which would change from green to red. Alternatively, students could make a pH indicator (e.g. from red cabbage, red onion, blueberries, beetroot or red or blue flowers etc.) to investigate colour changes, see [Acids and bases](#). Flinn Scientific have produced a nice video on this see <https://www.youtube.com/watch?v=vFjK8Tt-z8g>

References:

Flinn Scientific. 2012. 'Natural Indicators'. <https://www.youtube.com/watch?v=vFjK8Tt-z8g> (Accessed September 2017)

'Acids and bases'. Science ASSIST website. <https://assist.asta.edu.au/resource/2373/acids-and-bases> (Accessed September 2017)

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