

Date: Wed, 2 Jul 1997 08:55:31 +0800  
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To: knies@zoo.uvm.edu (Susan Nies)  
From: Central Chemical Consulting <central@chem.com.au>  
Subject: Re: LST color change

Dear Susan,

Don't be alarmed by the blue colour: as long as the LST has not been subject to temperatures above 150-200 C, then it should be essentially unaffected and reversible.

There are two almost separate issues (the colour & the heat):

1. The blue colouration is a 'famous' chemical reaction which polytungstates can undergo when chemically reduced. In common chemistry parlance you have formed 'heteropoly blues'. This can occur when a reducing agent comes in contact with the heavy liquid. At high temperatures, such as might occur if the heavy liquid crystallised on a hotplate, even dust/dirt can sometimes act as a reducing agent. (You can also get this colour if LST is contaminated by contact with iron.)

There are two ways to get rid of the dark colour. The easiest way when dealing with small quantities [like yours] is to add a few drops of 30% hydrogen peroxide solution (H2O2) to re-oxidise the LST. You don't need to overdo the addition of hydrogen peroxide. Typically you need add no more than 1-2 mL of 30% H2O2 for every 200 mL of affected LST heavy liquid, but it will depend on how much reduction there is. You then heat the discoloured LST and hydrogen peroxide at about 80 C to make the reaction go faster (it will fizz a little!), or just wait overnight for the blue to disappear. Another way to get rid of the colour is to pump the LST through a clean "activated carbon" water cartridge. This is extremely effective and most convenient for dealing with large quantities of discoloured LST. Unfortunately, I have not found activated carbon powder to be any good, because I couldn't filter off all the fine carbon afterwards!

2. I hope this hasn't happened to you, but it IS possible to decompose LST if it is heated strongly enough. This requires temperatures above 150-200 C. During trials I have 'cooked' LST by accident, through leaving it on a hotplate for too long. Hotplates often reach temperatures above 200 C when turned up more than half-way, and any crystallised LST can reach this excessive temperature if the solid is at the bottom of the beaker. If after getting rid of the colour your LST forms a not-very-soluble white solid, then the LST might have been decomposed by excessive heat. If that is the case, discard the less soluble material and check that the remaining LST can reach its full strength

Because of all this, it is a good policy to use a thermostatted hotplate and set the maximum temperature to 150 C if you think that there is a chance it could dry out. While LST is present as a liquid or solution, the evaporation of water keeps the temperature below 110 C, so you can have the hotplate set somewhat higher. If you have the facilities, it is a good idea to evaporate washings by placing the LST in shallow dishes in a fan-forced oven set at 110-120 C. Then, even if the LST dries out totally, there is no damage; you just add a little water to the solid to reconstitute the LST heavy liquid.

I hope this helps. Let me know how you get on.

Best regards,

Vince

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At 11:29 AM 1/07/97 -0400, you wrote:

>Dear Vincent,

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>Thanks very much for your advice a while back on filtration of LST. Our  
>filtration is going much more smoothly now, but we have had an odd  
>occurrence I'd like to ask you about. Several beakers of LST were left to  
>concentrate overnight on the hotplate and a few started to crystallize.  
>One in particular had completely crystallized, and when it was redissolved  
>in water it turned a very dark black/purplish color! The color persists  
>after filtration. Any clues as to the cause of this transformation?

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>Thanks again!

>

>K. Susan Nies