

Making Soap

Introduction

In this experiment you are going to make your own sample of soap. You will use this sample of soap to attempt to remove some engine oil from a piece of cloth.



Apparatus

goggles
bench mat
250cm³ beaker
100cm³ beaker
400cm³ beaker
25cm³ measuring cylinder

glass rod
water bath
digital balance
deionised water
piece of cloth
engine oil

Buchner flask and funnel
filter paper
water pump
sodium hydroxide 
methylated spirit 
sodium chloride

Method

- Put 10g of your chosen oil into a 250cm³ beaker.
- In a fume cupboard**, put 20cm³ of distilled water in a 100cm³ beaker, and carefully add 5g of sodium hydroxide  (see Health and Safety Notes overleaf). This will give a 25% solution. Note the change of temperature as the sodium hydroxide dissolves.
- When your sodium hydroxide solution has cooled to room temperature, add 20cm³ of methylated spirit  to it. Stir the solution with a glass rod, then add it to the beaker containing your oil.
- Heat the mixture on a water bath for 45 minutes, occasionally adding a small portion of a 1:1 (volume:volume) mixture of methylated spirit and water (40cm³ in total) to it over this period.
- While your mixture is heating there are two tasks you should perform:
 - Prepare a solution of 50g of sodium chloride in 150cm³ of water in a 400cm³ beaker. The last few crystals of sodium chloride may be very slow to dissolve, and you should stir the contents of the beaker frequently towards the end.
 - Take the piece of cloth provided, and stain it with a couple of drops of engine oil.
- After your mixture has been heated for 45 minutes, add three drops of your fragrance to your mixture, stir the mixture well, and then quickly pour the entire contents of the beaker into the saturated salt solution.
- Stir the mixture thoroughly for several minutes, and then cool the beaker and its contents to room temperature using an ice-bath.
- Collect your precipitated soap by filtering the mixture using a Buchner funnel.
- Wash your soap with two portions (about 50cm³ in all) of ice-cold water. Allow the first portion of water to drain away before adding the second.

Tests on your soap sample

- Test your soap (unless you feel that your skin is particularly sensitive) by rubbing a little of it between your thumb and forefinger.

Does it feel soapy?

- Wearing gloves, attempt to remove the engine oil stain from the square of cloth, using your soap.

Is it successful?

- Add a little soap to a test-tube half-full of tap water, stopper the tube and shake.

Can you produce a foam?

- Repeat the same test with distilled water.

Do you get more or less foam this time?

Health and Safety Notes

25% sodium hydroxide solution

Causes severe burns if allowed to come into contact with skin or eyes.

Irrigate with plenty of water if splashed.

methyated spirit

This is a highly flammable solvent and contains methanol, which is harmful when inhaled or when allowed to come into contact with the skin.

Avoid inhaling the vapours and contact with the skin, and make sure that there are no naked flames in your vicinity when you are using it.