

21: Silvered Glass Balls

Try your skill at glass-blowing. Blow a round bulb and let it cool. Then fill it with a special solution that reacts to make a mirror of real silver on the inside. The ball will look like a Christmas tree decoration.



eye protection
must be worn



hot glass



CORROSIVE
silver nitrate



IRRITANT
sodium hydroxide

What you will need

For glass-blowing

a length of clean soda glass tubing
Bunsen burner

heat proof mat
eye protection

For silvering the glass

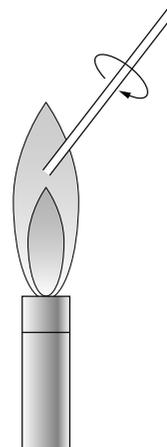
about 5 cm³ of Tollen's reagent in
a test tube
test tube rack
glucose
small spatula
teat pipette
hot water from a kettle
250 cm³ glass beaker

eye protection

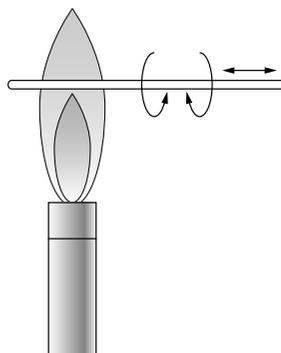
What you do

Making the glass 'ball'

- 1 Light your Bunsen burner. Adjust it for a non-luminous flame with a double cone.
- 2 Take a length of glass tube. Hold it by the end that has smooth edges. Put the other end into the flame, just above the inner cone. Hold the tube as shown in the diagram on the right. The slight angle prevents your hand getting too close to the flame. Rotate the tube in the flame. Continue rotating the tube until the end has sealed.
- 3 Remove the sealed tube from the flame. Be careful, it is VERY hot. Hot glass does not always look hot!
- 4 Check that the glass tube has been sealed.
- 5 Now for the glass-blowing. Make sure your hair will not get near the burner flame.



sealing tube



melting 2-3 cm glass
pre-blowing

- 6 Put the sealed end of the tube into the flame, holding it horizontally and rotating it so it heats evenly - see diagram at left. Heat it VERY STRONGLY until the end of the tube has softened. When it is really hot it will be difficult to keep it horizontal. At this point remove the end from the flame and BLOW HARD into the tube. You should be able to blow a ball about 2 cm in diameter.

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- 7 Put your glass ball down on a heat proof mat. Allow at least ten minutes for the hot glass to cool.

Silvering the glass

- 8 Collect about 5 cm³ of Tollen's reagent in a test tube. Your teacher may show you how to make this yourself.
- 9 Add about 0.25 g of glucose to the reagent. Stir the mixture.
- 10 Make sure your glass 'ball' is now completely cool.
- 11 Use a teat pipette to fill the ball with the Tollen's reagent-glucose mixture. The ball should be full.
- 12 Boil a kettle of water. Pour the hot water into the 250 cm³ glass beaker until it is about three-quarters full.
- 13 Place the full ball in the hot water. A silver mirror will form at once. You should now have a silver ball.
- 14 The ball must be carefully emptied. Your teacher will supervise this as you must avoid splashes. The used solution should be washed down the sink with plenty of water.
- 15 The inside of the ball must now be rinsed several times. The washings must be put down the sink with plenty of water.
- 16 If any of the Tollen's reagent-glucose mixture is left over, wash it down the sink with plenty of water.

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