

## Preparing solutions for microscale chemistry

### Barium (nitrate)

To prepare a  $0.2 \text{ mol dm}^{-3}$  barium nitrate solution, dissolve 5.2 g of  $\text{Ba}(\text{NO}_3)_2$  in  $100 \text{ cm}^3$  of deionised water.

Barium nitrate is an oxidizing agent and is harmful if swallowed or inhaled.

A  $0.2 \text{ mol dm}^{-3}$  solution is of low hazard.

### Calcium (nitrate)

To prepare a  $0.5 \text{ mol dm}^{-3}$  calcium nitrate solution, dissolve 11.8 g of  $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

To prepare a  $0.2 \text{ mol dm}^{-3}$  calcium nitrate solution, dissolve 4.7 g of  $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

Calcium nitrate is an oxidizing agent, is harmful if swallowed and is a skin/eye irritant.

A  $0.5 \text{ mol dm}^{-3}$  solution is a skin/eye irritant and a  $0.2 \text{ mol dm}^{-3}$  solution is of low hazard.

### Chromium (potassium chromate)

To prepare a  $0.2 \text{ mol dm}^{-3}$  potassium chromate solution, dissolve 3.9 g of  $\text{K}_2\text{CrO}_4$  in  $100 \text{ cm}^3$  of deionised water.

Potassium chromate is a carcinogen, mutagen and skin sensitiser as well as a skin/eye/respiratory irritant.

A  $0.2 \text{ mol dm}^{-3}$  solution is a carcinogen, mutagen and skin sensitiser.

### Cobalt (nitrate)

To prepare a  $0.5 \text{ mol dm}^{-3}$  cobalt nitrate solution, dissolve 14.6 g of  $\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

Both the solid and a  $0.5 \text{ mol dm}^{-3}$  solution is a carcinogen, mutagen, reproductive toxin, skin and respiratory sensitiser and toxic to aquatic life.

### Copper (sulfate)

To prepare a  $0.5 \text{ mol dm}^{-3}$  copper sulfate solution, dissolve 12.5 g of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

To prepare a  $0.2 \text{ mol dm}^{-3}$  copper sulfate solution, dissolve 5.0 g of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

Copper sulphate causes serious eye damage, is harmful if swallowed and is toxic to aquatic life.

Both  $0.5$  and  $0.2 \text{ mol dm}^{-3}$  solutions cause serious eye damage and are toxic to aquatic life.

## Iron

### Iron(III) nitrate

To prepare a  $0.2 \text{ mol dm}^{-3}$  iron(III) nitrate solution, dissolve 8.1 g of  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

Iron(III) nitrate is an oxidiser and a skin/eye/respiratory irritant.

A  $0.3 \text{ mol dm}^{-3}$  solution is of low hazard.

### Iron(II) sulfate

To prepare a  $0.2 \text{ mol dm}^{-3}$  iron(II) sulfate solution, dissolve 5.6 g of  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water. Add sulphuric acid ( $1 \text{ mol dm}^{-3}$ ) to make up to  $200 \text{ cm}^3$ . (The presence of the acid minimises the hydrolysis of iron(II).)

Iron(II) sulphate is harmful if swallowed and a skin/eye irritant.

A  $0.2 \text{ mol dm}^{-3}$  solution made as above will be of low hazard.

### Lead (nitrate)

To prepare a  $0.5 \text{ mol dm}^{-3}$  lead nitrate solution, dissolve 16.6 g of  $\text{Pb}(\text{NO}_3)_2$  in  $100 \text{ cm}^3$  of deionised water.

Lead nitrate is an oxidiser, harmful if swallowed or inhaled, is corrosive to skin and eyes, is a reproductive toxin and is very toxic to aquatic life.

A  $0.5 \text{ mol dm}^{-3}$  solution is corrosive to skin and eyes, a reproductive toxin and very toxic to aquatic life.

### Lithium (bromide)

To prepare a  $1 \text{ mol dm}^{-3}$  lithium bromide solution, dissolve 4.3 g of lithium bromide in  $50 \text{ cm}^3$  of deionised water.

Lithium bromide is harmful if swallowed and a skin/eye irritant.

A  $1 \text{ mol dm}^{-3}$  solution is of low hazard.

## Magnesium (nitrate)

To prepare a  $0.5 \text{ mol dm}^{-3}$  magnesium nitrate solution, dissolve 7.4 g of  $\text{Mg}(\text{NO}_3)_2$  in  $100 \text{ cm}^3$  of deionised water.

Magnesium nitrate is an oxidiser and a skin/eye/respiratory irritant.

A  $0.5 \text{ mol dm}^{-3}$  solution is of low hazard.

## Manganese (potassium manganate)

To prepare a  $0.01 \text{ mol dm}^{-3}$  potassium manganate(VII) solution, dissolve 0.16 g of  $\text{KMnO}_4$  in  $100 \text{ cm}^3$  of deionised water.

Potassium manganate VII is an oxidiser, is harmful if swallowed and is toxic to aquatic life.

A  $0.01 \text{ mol dm}^{-3}$  solution is of low hazard.

## Molybdenum (ammonium molybdate)

To prepare a  $0.05 \text{ mol dm}^{-3}$  ammonium molybdate solution, dissolve 6.2 g of  $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24}\cdot 4\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of water.

Ammonium molybdate is harmful if swallowed and a skin/eye/respiratory irritant.

A  $0.05 \text{ mol dm}^{-3}$  solution is of low hazard.

## Nickel (nitrate)

To prepare a  $0.5 \text{ mol dm}^{-3}$  nickel nitrate solution, dissolve 14.5 g of  $\text{Ni}(\text{NO}_3)_2\cdot 6\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

Nickel nitrate is an oxidiser, is harmful if swallowed or inhaled, is a skin irritant, causes serious eye damage, is a skin and respiratory sensitiser, is a carcinogen (by inhalation), a mutagen, a reproductive toxin, causes damage to organs and is very toxic to aquatic life.

A  $0.5 \text{ mol dm}^{-3}$  solution is a skin irritant, causes serious eye damage, is a skin and respiratory sensitiser, is a carcinogen (by inhalation), a mutagen, a reproductive toxin, causes damage to organs and is very toxic to aquatic life.

## Potassium

### Potassium bromide

To prepare a  $0.2 \text{ mol dm}^{-3}$  potassium bromide solution, dissolve 2.4 g KBr in  $100 \text{ cm}^3$  of deionised water.

Potassium bromide is an eye irritant.

A  $0.2 \text{ mol dm}^{-3}$  solution is of low hazard.

### **Potassium iodide**

To prepare a  $0.2 \text{ mol dm}^{-3}$  potassium iodide solution, dissolve 3.3 g KI in  $100 \text{ cm}^3$  of deionised water.

Potassium iodide is an eye irritant.

A  $0.2 \text{ mol dm}^{-3}$  solution is of low hazard.

### **Silver (nitrate)**

To prepare a  $0.1 \text{ mol dm}^{-3}$  silver nitrate solution, dissolve 1.7 g of  $\text{AgNO}_3$  in  $100 \text{ cm}^3$  of deionised water. Store in a dark place.

Silver nitrate is an oxidiser, is corrosive to skin and eyes and is very toxic to aquatic life.

A  $0.1 \text{ mol dm}^{-3}$  solution is a skin/eye irritant.

## **Sodium**

### **Sodium fluoride**

To prepare a  $0.5 \text{ mol dm}^{-3}$  sodium fluoride solution, dissolve 1.1 g of NaF in  $50 \text{ cm}^3$  of deionised water.

Sodium fluoride is toxic if swallowed and a skin/eye irritant.

A  $0.5 \text{ mol dm}^{-3}$  solution is of low hazard.

### **Sodium carbonate**

To prepare a  $0.5 \text{ mol dm}^{-3}$  sodium carbonate solution, dissolve 5.3 g of  $\text{Na}_2\text{CO}_3$  in  $100 \text{ cm}^3$  of deionised water.

Sodium carbonate is an eye irritant.

A  $0.5 \text{ mol dm}^{-3}$  solution is of low hazard.

### **Sodium chloride**

To prepare a  $0.5 \text{ mol dm}^{-3}$  sodium chloride solution, dissolve 2.9 g of NaCl in  $100 \text{ cm}^3$  of deionised water.

Sodium chloride is of low hazard.

### **Sodium sulfate**

To prepare a  $0.5 \text{ mol dm}^{-3}$  sodium sulfate solution, dissolve 7.1 g of  $\text{Na}_2\text{SO}_4$  in  $100 \text{ cm}^3$  of deionised water.

Sodium sulfate is of low hazard.

### **Strontium (nitrate)**

To prepare a  $0.5 \text{ mol dm}^{-3}$  strontium nitrate solution, dissolve 10.6 g of  $\text{Sr}(\text{NO}_3)_2$  in  $100 \text{ cm}^3$  of deionised water.

Strontium nitrate is an oxidiser and causes serious eye damage.

A  $0.5 \text{ mol dm}^{-3}$  solution causes serious eye damage.

### **Tungsten (sodium tungstate)**

To prepare a  $0.2 \text{ mol dm}^{-3}$  sodium tungstate solution, dissolve 6.6 g of  $\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

Sodium tungstate is harmful if swallowed, causes serious eye damage and is toxic to aquatic life.

A  $0.2 \text{ mol dm}^{-3}$  solution causes serious eye damage and is toxic to aquatic life.

### **Vanadium (ammonium vanadate)**

To prepare a  $0.2 \text{ mol dm}^{-3}$  ammonium vanadate solution, dissolve 2.3 g  $\text{NH}_4\text{VO}_3$  in  $100 \text{ cm}^3$  of deionised water.

Ammonium vanadate is harmful if swallowed, inhaled or in contact with the skin.

A  $0.2 \text{ mol dm}^{-3}$  solution is of low hazard.

### **Zinc (sulfate)**

To prepare a  $0.2 \text{ mol dm}^{-3}$  zinc sulfate solution, dissolve 5.8 g of  $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$  in  $100 \text{ cm}^3$  of deionised water.

Zinc sulphate is harmful if swallowed, causes serious eye damage and is toxic to aquatic life.

A  $0.2 \text{ mol dm}^{-3}$  solution causes serious eye damage and is toxic to aquatic life.