-------Identifying Cations-----

There are two ways of testing for cations:

A. By using sodium hydroxide or aqueous ammonia solution.

B. Flame test

A: By using sodium hydroxide or aqueous ammonia solution.

Procedure:

- 1.Put a small amount of solution you want to identify into a test tube.
- 2.Add a few drops of aqueous sodium hydroxide.
- Observe the colour of the precipitate formed.
- Add excess sodium hydroxide and shake the test tube.
- Record whether or not the precipitate dissolves and any colour change.

Note :

- Sodium hydroxide and ammonia react in a similar way with some of the ions. However we use these two alkalis to distinguish between the colourless solutions containing the aluminum and zinc ions.
- If the alkalis are not in excess, the precipitates formed are metal hydroxides.

www.smartedunub.com

Identifying Cations

Metal cation	Result with aqueous NaOH	Result with aqueous ammonia
Al^{3+}	White precipitate	White precipitate
	Soluble in excess (Colourless solution)	Insoluble in excess
Ca^{2+}	White precipitate	No precipitate or very slight white precipitate
	Insoluble in excess (Colourless solution)	
Cu^{2+}	Light blue precipitate	Light blue precipitate
	Insoluble in excess	Soluble in excess (Dark blue solution)
Cr^{3+}	Grey-green precipitate	Grey-green precipitate
	Soluble in excess , green solution	Soluble in excess , green solution, partly dissolves on standing to form a violet solution
Fe^{2+}	Grey-green precipitate	Grey-green precipitate
	Insoluble in excess	Insoluble in excess
Fe^{3+}	Reddish brown precipitate	Reddish brown precipitate
	Insoluble in excess	Insoluble in excess
Zn^{2+}	White precipitate	White precipitate
	Soluble in excess (Colourless solution)	Soluble in excess (Colourless solution)

www.smartexamresources.com

Test for ammonium ions:

Heat the solution with sodium hydroxide solution. If the solution contains ammonium ions, then ammonia gas will be given off which will turn damp red litmus paper blue.

NH_4^+ + OH^- ⟶ NH_3 + H_2O

ammonium ions		hydroxide ions		ammonia gas		water

Flame tests for cations:

A flame test can be used to identify some cations especially those in compounds containing elements from Group1 and 2.

Procedure:

- Clean a platinum or a nichrome wire by dipping it in concentrated hydrochloric acid.
- Place a sample of a compound on the end of the wire.
- Hold the wire on the edge of a non-luminous(blue) Bunsen flame.
- Note any change in the colour of the flame.

Metal ion	Flame colour
Li^+	Red/Bright red
Na^+	Golden yellow/orange
K^+	Purple/lilac
Cu^{2+}	Blue-green
Ba^{2+}	Apple green
Ca^{2+}	Brick red

www.smartedubub.com