Flame Tests

Question

What is the unidentified metal in a metallic compound?

Analysis

(a) Assemble your observations for the identified samples into a flame test identification key (**Table 1**), which you can use as a quick reference.

Table 1 Flame Test Identification Key for Some Metallic Compounds

Metallic compound	Flame test colour
solid sodium nitrate, $NaNO_{3(s)}$	
solid sodium chloride, $NaCl_{(s)}$	
aqueous sodium chloride, $NaCl_{(aq)}$	
solid calcium chloride, $CaCl_{2(s)}$	
solid strontium chloride, $SrCl_{2(s)}$	
solid lithium chloride, $LiCl_{(s)}$	
solid potassium chloride, $KCl_{(s)}$	
solid copper(II) chloride, $CuCl_{2(s)}$	

Flame test colour of the unidentified metallic compound: _____

(b) Analyze your observations, and then answer the Question.

Evaluation

(c) Suggest possible sources of error in this activity, and describe their possible effects on your results. What changes could you make to the Procedure to reduce these sources of error?

(d) Compare the results of your flame tests for solid sodium nitrate, solid sodium chloride, and sodium chloride solution. What do these results indicate?

(e) Compare the results of your flame tests for potassium chloride and sodium chloride, with and without the cobalt glass. What was the purpose of the cobalt glass?

Synthesis

(f) **Figure 1** (Activity 1.7 in the Student Text) shows the results of four flame tests. Using your flame test identification key, identify the metal in each compound in **Figure 1**.

(g) Explain why flame tests are a qualitative analysis technique. Use the Procedure and observations in this activity to support your answer.

(h) Flame emission spectroscopy is a technique that is used to identify the components of different types of matter. Using electronic and print resources, compile a list of situations in which flame emission spectroscopy is used.

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