Marking Scheme for

THE PREPARATION OF THE ELEMENT IODINE

Maximum = 9

(1) = Proper layout

Purpose: To prepare crystals of iodine and observe some properties of iodine.

Method: See handout sheet "The Preparation of the Element Iodine"

Apparatus: See handout sheet "The Preparation of the Element Iodine"

Observations:

(1/2) • Potassium iodide is a colourless solid, manganese (IV) oxide is a black powder and phosphoric acid is a thick, colourless liquid.
• The mixture of manganese (IV) oxide and potassium iodide was black with which specks.
• When phosphoric acid was added to the mixture there was no visible change.
(1/2) • When the beaker of chemicals was heated, a purple gas was produced. As more heat was added, the gas became a darker purple and some of the purple material collected on the underside of the watch glass in the form of a dark grey solid. Eventually, the purple colour of the gas was decreased in amount and heating was stopped.
(1/2) • After the beaker cooled, the watch glass had a large amount of long flat leafy crystals on the underside.

(1/2) • When iodine is mixed with water and shaken, a light yellow colour is produced but not all of the crystals dissolve.
(1/2) • When iodine is mixed with hexane and shaken, a dark purple colour is produced and most of the iodine dissolves.
(1/2) • When a few crystals of iodine are heated in a test tube, the crystals melt a produce a dark purple gas which solidifies on the inside of the test tube at the top.

Questions

(1) 1. Iodine appears to be more soluble in hexane because most of the solid dissolved in hexane but very little dissolved in water.

(1) 2. The crystals disappeared overnight because they evaporated.

(1) 3. To separate a mixture of sand and iodine, add some hexane to the mixture and dissolve the iodine out of the mixture, leaving the sand behind.

OR

Heat the mixture of sand and iodine. The iodine will turn to a gas and leave the sand behind.

Conclusions

(1/2) • Iodine is a dark purple black solid.
(1/2) • When heated, iodine turns to a purple gas
(1/2) • Iodine dissolves slightly in water to produce a yellow solution.
(1/2) • Iodine dissolves more in hexane than in water and produces a purple solution in hexane.