

SYNTHESIS OF ZINC IODIDE

TRACKING A CHEMICAL REACTION

©2019, 2000, 1996, 1993 by David A. Katz. All rights reserved.
Reproduction permitted for education purposes.

MATERIALS NEEDED:

0.1 g zinc metal, Zn, dust (can substitute 20 or 30 mesh)
zinc metal, Zn, mossy or strip
0.1 g iodine, I₂, crystal
water, distilled or deionized
½ of a disposable petri dish or a watch glass (10-12 cm diameter)
stirring rod
Zip-lock type bag, gallon size
dropper
funnel
filter paper
ring or funnel support
beakers, 2 25-mL, 2 50-mL
conductivity tester
Bunsen burner or hot plate
ring stand with ring support or tripod
wire gauze
tongs
plastic weighing dishes or weighing paper
Optional: disposable gloves

SAFETY PRECAUTIONS:

Wear safety goggles or glasses at all times in the laboratory.

Zinc metal dust is flammable. Keep it away from any flames or ignition sources.

Iodine vapors are toxic. Keep containers of iodine closed when not in use. Work in a well ventilated area.

Iodine is corrosive. In the event of skin contact with iodine, immediately rinse with cold water. The iodine will leave yellow stains on the skin. Protect your hands with appropriate gloves and change gloves when contaminate with iodine. Clean up any spills immediately.

Make sure that the Zip-loc bag is sealed before starting the reaction.

DISPOSAL:

Dispose of the zinc iodide solution in the Halogen Waste container or as directed by your instructor.

The zip-loc bag, disposable gloves, and disposable petri dish can be disposed of in the trash.

EXPERIMENTAL PROCEDURE:

Obtain 0.1 g each of powdered zinc and iodine. Examine the samples of zinc and iodine. Note their appearance and physical properties.

Test both solids for conductivity. Test the conductivity of a piece of mossy zinc or zinc strip. (See Table 1)

Test some distilled or deionized water for conductivity.

Add a small amount of the zinc to some distilled or deionized water in a 25-mL beaker. Do you observe any changes? Test the conductivity.

Add a small amount of the iodine to some distilled or deionized water in a 25-mL beaker. Do you observe any changes? Test the conductivity.

Place the remaining dry zinc and the dry iodine on a dry watch glass or disposable Petri dish. Mix them together, but do not grind them. Push the mixture into a little mound. Place the watch glass inside the zip-lock bag and zip it shut.

Place a sheet of white paper under the watch glass (or Petri dish) and plastic bag.

Fill the dropper (one squeeze) with distilled or deionized water. Poke it through the side of the plastic bag. Pull up the plastic bag above the watch glass/Petri dish.

Add one drop of water to the mixture in the watch glass/Petri dish. Is there any evidence of a chemical reaction?

Add the rest of the water to the mixture, drop by drop, until no further reaction occurs. Record any additional observations.

Remove the watch glass/petri dish from the plastic bag.

Filter the solution into a small beaker. Wash the solution from the watch glass/petri dish into a filter paper in a funnel using a minimum amount of distilled water from a wash bottle. Wash the filter paper with 1 or 2 mL of distilled water.

Test the filtered solution in the beaker for conductivity. Look closely at the two electrodes as you test the conductivity. Do you observe any changes near the electrodes?

Place the beaker on a hotplate or a ring stand or tripod. If possible, work under a hood. Heat it gently to just evaporate the water. Allow the beaker and contents to cool.

Observe the contents of the beaker. Test the solid for conductivity.

Test the solid for solubility by adding a few mL of distilled water to the beaker. Test the liquid for conductivity.

Summarize your observations and results of this experiment.

CLEAN UP

Dispose of all solutions in the proper waste containers.

Clean up all apparatus used with soapy water. Rinse well before placing apparatus in your laboratory drawer or returning it to the stockroom.

Table 1. Conductivity scale for conductivity measurements.

Scale	Red LED	Green LED	Conductivity
0	off	off	very low or none
1	dim	off	low
2	medium	off	medium
3	bright	dim	high
4	very bright	medium	very high

REFERENCE:

This experiment is based on Kinsley, Therese Huang, *Synthesis and Decomposition of ZnI₂*, **CHEM 13 NEWS**, September 1993, No 223, page 15.

SYNTHESIS OF ZINC IODIDE

TRACKING A CHEMICAL REACTION

Name: _____ Course/Section: _____

Partner's Name (if applicable): _____ Date: _____

DATA and QUESTIONS:

1. What are some properties of the elements used in this experiment?

2. Conductivity:

Zinc metal, mossy or strip:

Zinc metal, powder:

Iodine crystals

Distilled or deionized water:

Mixture of zinc metal with deionized water:

Mixture of iodine with deionized water:

3. Describe any changes that take place upon the addition of water to the zinc and iodine mixture.

4. Did you observe anything happening at the electrodes of the conductivity tester during any of the tests?
5. Compare the final product with the starting materials used in this experiment.
6. Did the final product exhibit any conductivity?
7. What is your explanation for the events that took place in this experiment?
8. Write a chemical equation for the reaction that took place.