Zippie Chemistry 1: Acid-Base Reactions

Experiments carried out in Ziploc bags (1L or 3L)

Background

This experiment allows the implementation of IBSE while involving hands-on, minds-on activities for students using acid-base reactions. These acid-base reactions produce CO_2 gas.

Ziploc® bags (1L or 3L) have a plastic zip closure mechanism which ensures that the bag is watertight and airtight

Safety

- ✓ Goggles
- ✓ Disposable gloves

For Zippy Chemistry 1–4 you will need...

- ✓ Ziploc bags (1L or 3L)
- ✓ Condiment cups (marked at 5 cm^3 using a permanent marker if using a 1 L bag or at 15 cm^3 if using a 3 L bag)
- ✓ red cabbage indicator made by boiling it for approximately 10 minutes.

Use the red cabbage indicator to make the following solutions in 500 mL bottles:

- ✓ vinegar (approximately 2/3 of the volume in the bottle)
- ✓ water
- ✓ dilute lemon juice
- ✓ sodium hydrogen carbonate (1 teaspoon ≈ 5 mL)
- ✓ sodium carbonate (1 teaspoon)
- ✓ Epsom salts
- ✓ anhydrous calcium chloride
- ✓ dilute iodine (a few drops)

Follow these steps

1. Create a mixture in the Ziploc bag involving an acid and a base e.g. 1 tsp (5 mL) of washing soda crystals with 1 tsp of any other solid (Place them in opposite corners of Ziploc bag using spoon).
2. Add 5 cm^3 vinegar or lemon juice by placing the liquid in a condiment cup.
3. Expel air from the bag when sealing it and leave reactants undisturbed.
4. Mix reactants by shaking and observe.

So what happened?

The red cabbage indicator may change colour and the reaction will be slightly exothermic. As the bases in this experiment are carbonates, carbon dioxide will be produced.

What next?

1. Try the experiment with other materials and liquids
2. Use a pH meter to check the pH of the solution against the colour