Some reactions of carbon dioxide

Topic

Gases.

Timing

20 min.

Apparatus (per group)

- Student information sheet and worksheet
- One clear plastic sheet (*eg* ohp sheet)
- One 9 cm plastic petri dish (base + lid)
- One plastic pipette
- Scissors.

Chemicals (per group)

Solutions contained in plastic pipettes, see 'Apparatus and techniques for microscale chemistry' handout.

- Hydrochloric acid 1 mol dm^{-3}
- Barium nitrate solution 0.2 mol dm^{-3}
- Sodium hydroxide 0.5 mol dm^{-3}
- Small marble chips.

Method

The action of hydrochloric acid on marble chips generates carbon dioxide:

$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(s) + CO_2(g) + H_2O(l)$

Tests

1. The barium nitrate and sodium hydroxide drops should show no change.
2. The barium nitrate and sodium hydroxide mixture should turn cloudy owing to the formation of the very insoluble barium carbonate from the reaction of the (acidic) carbon dioxide gas with (alkaline) barium hydroxide.

Health & Safety

Students must wear suitable eye protection (Splash resistant goggles to BS EN166 3).

Hydrochloric acid, 1 mol dm^{-3} HCl (aq) is of low hazard.

Sodium hydroxide, 0.5 mol dm^{-3} NaOH is corrosive. (Reducing the concentration to 0.4 mol dm^{-3} means it is irritant with less of a requirement for goggles)

Barium nitrate, 0.2 mol dm^{-3} $Ba(NO_3)_2$ (s) is a skin/eye irritant.

Credits

Health & safety checked May 2018

Page last updated August 2018