

Lead compounds – precipitation reactions and pigments

Topic

Lead compounds – precipitation reactions and pigments.

Timing

20 min.

Apparatus (per group)

- One student worksheet
- One clear plastic sheet (eg ohp sheet).

Chemicals (per group)

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

- Sodium hydroxide 1 mol dm^{-3}
- Lead nitrate 0.5 mol dm^{-3}
- Potassium iodide 0.2 mol dm^{-3}
- Sodium chloride 0.5 mol dm^{-3}
- Potassium bromide 0.2 mol dm^{-3}
- Sodium carbonate 0.5 mol dm^{-3}
- Sodium sulphate 0.5 mol dm^{-3}
- Potassium chromate 0.2 mol dm^{-3} .

Observations

Part A

The addition of solutions of each of the anions produces precipitates, which indicates that in general lead compounds are insoluble. The iodide is an intense yellow colour, the chromate(VI) is also yellow and both could be used as pigments except for the fact that lead compounds are toxic.

Part B

The fact that lead forms insoluble compounds is used as a basis for indicating the presence of anions in water. The addition of deionised water to lead nitrate gives no cloudiness. However, with tap water a cloudiness gradually develops if the water is from a hard water area since carbonates, sulphates or hydrogencarbonates may be present. If you live in a soft water area there will probably be no cloudiness. (One solution is to simulate hard water conditions.)

Health & Safety

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

Sodium hydroxide solution, 1 mol dm^{-3} NaOH (aq), is CORROSIVE.



Lead nitrate, $0.5 \text{ mol dm}^{-3} \text{ Pb}(\text{NO}_3)_2 \text{ (aq)}$ is a Reproductive Toxin, Causes eye damage, is a Specific Target Organ Toxin and a probable carcinogen.

Potassium bromide, 0.2 mol dm^{-3} , KBr (aq) , Sodium sulphate, $0.5 \text{ mol dm}^{-3} \text{ Na}_2\text{SO}_3 \text{ (aq)}$, sodium carbonate 0.5 mol dm^{-3} and Potassium iodide, 0.2 mol dm^{-3} , KI(aq) are low hazard.

Potassium chromate, $0.2 \text{ mol dm}^{-3} \text{ K}_2\text{CrO}_4$ is a carcinogen, mutagen and skin sensitiser. It is also toxic to aquatic life.. Wear splash-proof eye-protection if transferring large amounts. Avoid skin contact.

Credits

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Health & safety checked May 2018

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