

Simulated Bayer Process

Topic: Refinery

You Will Need:

- Borax
- Sand
- Mud
- Distilled water
- 150ml Beakers / stirring rod
- Plastic cup
- Filter paper or syringe with filter attachment
- Microwave

What You Need to Do

Create the slurry

- Mix the borax, sand and mud together in equal quantities – this simulates 'bauxite ore'
- Weigh 100g of 'bauxite ore'
- Place into 150ml beaker
- Add 100ml of distilled water

Digestion

- Place in microwave on 100% power for 45 seconds
- Remove carefully
- Stir with stirring rod
- Allow to stand for 10 seconds

Clarification

- Decant into a plastic cup (note sand in bottom of beaker)
- Assemble syringe filter
- Draw 35ml solution from plastic cup
- Expel first 20ml of this back into a beaker
- Alternatively use the filter paper to filter the solution
- Once filtrate is clear, transfer remainder into a fresh 150ml beaker

Precipitation

- Cool on crushed ice until crystals first appear (after temperature drops to 40°C, leave for about 2 minutes)

Extension/ Alternatives

- Describe the process in your own words.
- What else could you use to simulate the Bayer process?

Discussion

- The filtrate is supersaturated. As it cools, crystals will precipitate out until new solubility equilibrium is reached.
- Stir and note what happens.

Curriculum Links

Science: Investigating, Natural and Processed Materials

Technology and Enterprise: Technology Process