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# Preparation of Aluminium Hydroxide

Experiment 6 - Practical Notes

Name: \_\_\_\_\_ Roll no.: \_\_\_\_\_ Date: \_\_\_\_\_

## Aim

To prepare an aluminium hydroxide precipitate and explain precipitation, washing and yield basis.

## Principle

Controlled addition of a suitable alkaline reagent to an aluminium-salt solution produces  $\text{Al(OH)}_3$ . The hydroxide is amphoteric and can dissolve in sufficiently strong excess alkali. Fresh precipitate is hydrated; a wet gel mass cannot be assumed to be the mass of pure dry  $\text{Al(OH)}_3$ .

## Requirements

- Prescribed aluminium salt and alkaline reagent, water and test reagents for residual soluble salts.
- Beakers, balance, stirring equipment and suitable filtration apparatus.

## Procedure

### 1. Calculate

Record the aluminium salt's hydrate form and assigned quantities. Calculate the ideal dry-product amount from the balanced reaction.

### 2. Prepare solutions

Dissolve the prescribed aluminium salt in water. Prepare or obtain the instructor-approved alkaline reagent.

### 3. Precipitate

Add the reagent gradually with stirring under the stated pH and temperature conditions. Avoid uncontrolled excess strong alkali.

### 4. Collect and wash

Separate the precipitate as prescribed and wash to remove soluble salts, checking the washings by the assigned test.

### 5. Finish

Retain as gel or dry under the prescribed method, depending on the exercise. Record appearance, recovered mass and its wet, dry or assay basis.

**Pharmaceutical Inorganic and Analytical Chemistry****Observations and Record**

| Stage              | Required observation           | Record |
|--------------------|--------------------------------|--------|
| Precipitation      | Appearance and final condition | _____  |
| Washings           | Specified residual-salt test   | _____  |
| Recovered material | Wet / dry basis and mass       | ___ g  |

**Worked Example**

The numbers below are illustrative; enter your own observations in the record.

- Ideal reaction with ammonia solution:  $\text{Al}_2(\text{SO}_4)_3 + 6 \text{NH}_4\text{OH} \rightarrow 2 \text{Al}(\text{OH})_3 + 3 (\text{NH}_4)_2\text{SO}_4$ .  $\text{NH}_4\text{OH}$  represents aqueous ammonia in this teaching equation.
- If 2.00 g  $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$ , molar mass approximately 666.42 g/mol, reacts ideally:  $\text{Al}(\text{OH})_3 = (2.00/666.42) \times 2 \times 78.00 \approx 0.468$  g.
- This is an ideal dry  $\text{Al}(\text{OH})_3$  yield. Do not calculate percentage yield from the uncorrected mass of a wet hydrated gel.

**Result**

The precipitate was described as \_\_\_\_\_. Recovered mass = \_\_\_\_ g on a \_\_\_\_ basis; washings met \_\_\_\_ test.

**Precautions**

- Avoid excess strong alkali because aluminium hydroxide is amphoteric.
- Wash under the prescribed method; visible whiteness does not prove absence of soluble salts.
- Use the stated hydrate and dry basis in yield calculations.

**Viva Questions and Answers****1. What does amphoteric mean?**

The material can react with both acids and suitable bases.

**2. Why wash the precipitate?**

To remove soluble salts and remaining reagents.

**3. Why is wet-gel yield misleading?**

The measured mass includes variable retained water.

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