

UNIT 9 • AMINES | Weightage: Low

9.8 Physical Properties of Diazonium Salts

A visual guide to the stability, state, and solubility of key diazonium salts.

The Standard Profile



Benzenediazonium Chloride

By default, benzenediazonium chloride exists as a colourless, crystalline solid. However, its physical state and stability are highly dependent on temperature and moisture.



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Chloride vs. Fluoroborate

Benzenediazonium Chloride



- Readily soluble in water.
- Stable only in cold conditions.
- **Watch out — it reacts with water when warmed and decomposes easily in the dry state.**

Benzenediazonium Fluoroborate



- Insoluble in water.
- Stable at room temperature.
- Safe to handle and store without immediate decomposition.

Why does the anion change everything?

The diazonium cation itself is notoriously unstable. However, pairing it with the right anion completely alters its physical properties.

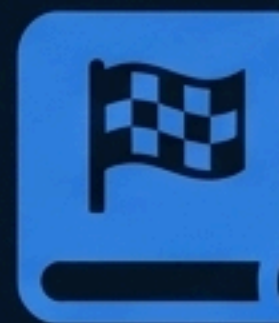


The Fluoroborate Effect

Unlike the small, simple chloride ion, the fluoroborate anion is large and complex. This bulkiness disrupts hydrogen bonding with water (causing water-insolubility) and effectively disperses charge, shielding the diazonium group from decomposing at room temperature.

Summary

1. Most diazonium salts (like chloride) are water-soluble but highly **unstable**, requiring strict cold storage and avoiding dry states.
2. Benzenediazonium fluoroborate is the crucial exception—its water-insolubility and room-temperature stability make it uniquely safe and useful for synthesis.



Physical Properties: Covered.

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