EngineeringRise

Diazonium salts and their synthetic importance

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Diazotisation	ArNH2 + NaNO2 + 2HCl giving ArN2+ Cl- + NaCl + 2H2O (273 to 278 K) Valid when: primary aromatic amine, cold (273 to 278 K), excess mineral acid	n/a (equation)
Sandmeyer	ArN2+ with CuCl/HCl, CuBr/HBr or CuCN/KCN giving ArCl, ArBr, ArCN + N2 Valid when: aryl diazonium salt with the matching cuprous salt and acid	n/a (equation)
Gattermann	ArN2+ with Cu powder and HX giving ArX + N2 Valid when: aryl diazonium salt with copper powder and HX	n/a (equation)
Iodide	ArN2+ + KI giving ArI + N2 + K+ Valid when: aryl diazonium salt with KI; no copper needed	n/a (equation)
Balz-Schiemann	ArN2+ BF4- on heating gives ArF + BF3 + N2 Valid when: isolated dry ArN2+ BF4- salt, heated	n/a (equation)
Hydroxyl and hydrogen	warm H2O gives ArOH; H3PO2 (or ethanol) gives ArH; each releases N2 Valid when: aryl diazonium salt; warm water gives ArOH, H3PO2 gives ArH	n/a (equation)
Coupling	ArN2+ + phenol (mildly alkaline) or aniline (mildly acidic) giving Ar-N=N-Ar-OH or Ar-NH2 (para) Valid when: phenol in mildly alkaline or aniline in mildly acidic solution, near 273 K	n/a (equation)
Reduction	ArN2+ with SnCl2/HCl giving ArNHNH2 (phenylhydrazine) Valid when: aryl diazonium salt with SnCl2 and HCl	n/a (equation)
Molar masses	C6H5N2+ 105; C6H5N2Cl 140.5; C6H5NH2 93; NaNO2 69	g per mol

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/organic-compounds-containing-nitrogen/diazonium-salts-and-their-syn

EngineeringRise is an unofficial study site. It is not affiliated with NTA, the IITs, BITS, VIT, SRM or any exam body.