Amines Topic Tree

Here are 30 important terms and their definitions related to *Amines*:

1. **Amine**: Organic compounds derived by replacing one or more hydrogen atoms of ammonia with alkyl or aryl groups.
2. **Primary Amine**: An amine where one hydrogen atom of ammonia is replaced by an alkyl or aryl group (RNH_2).
3. **Secondary Amine**: An amine where two hydrogen atoms of ammonia are replaced by alkyl or aryl groups (R_2NH).
4. **Tertiary Amine**: An amine where all three hydrogen atoms of ammonia are replaced by alkyl or aryl groups (R_3N).
5. **Quaternary Ammonium Salt**: A compound formed when a nitrogen atom carries a positive charge with four attached alkyl/aryl groups.
6. **Alkylamine**: Amines derived from alkyl groups, named as alkylamines (e.g., methylamine, ethylamine).
7. **Arylamine**: Amines derived from aryl groups, the simplest being aniline ($C_6H_5NH_2$).
8. **Aniline**: The simplest arylamine, also known as benzenamine, where an NH_2 group is attached to a benzene ring.
9. **Gabriel Phthalimide Synthesis**: A method for preparing primary amines by reacting phthalimide with alkyl halides followed by hydrolysis.
10. **Hoffmann Bromamide Degradation Reaction**: A reaction where an amide is treated with bromine and sodium hydroxide to form a primary amine with one less carbon atom.
11. **Ammonolysis**: The cleavage of the carbon-halogen bond in alkyl halides by ammonia, forming an amine.
12. **Diazotization**: The process of converting a primary aromatic amine into a diazonium salt using nitrous acid at low temperatures.
13. **Diazonium Salt**: A compound containing the diazonium group ($R–N_2^+X^-$), used in the synthesis of aromatic compounds.
14. **Sandmeyer Reaction**: A reaction where diazonium salts are treated with Cu(I) salts to replace the diazonium group with halides or cyanides.
15. **Gattermann Reaction**: A method to replace the diazonium group with chlorine or bromine by treating the diazonium salt with halogen acids and copper powder.
16. **Carbylamine Reaction**: A reaction where primary amines react with chloroform and potassium hydroxide to form isocyanides, used to distinguish primary amines.
17. **Azo Compounds**: Compounds formed by coupling diazonium salts with aromatic compounds, characterized by the –N=N– group.
18. **Nucleophilic Substitution**: A reaction where a nucleophile replaces a leaving group in a compound, as in the reaction of alkyl halides with amines.
19. **Hydrogen Bonding**: An intermolecular force in which hydrogen atoms in primary and secondary amines bond with electronegative atoms, influencing boiling points.
20. **Basicity**: The ability of amines to accept protons, determined by the availability of the lone pair of electrons on nitrogen.

21. **Electron Donating Group (EDG)**: Groups like alkyl (-R) that increase the electron density on the nitrogen atom, increasing the basicity of amines.
22. **Electron Withdrawing Group (EWG)**: Groups like nitro ($-NO_2$) or carbonyl (-CO) that decrease the electron density on the nitrogen atom, decreasing basicity.
23. **Resonance Effect**: The delocalization of electrons in a molecule, which can affect the reactivity and basicity of aromatic amines like aniline.
24. **Acylation**: A reaction where an amine reacts with an acid chloride or anhydride to form an amide.
25. **Aliphatic Amines**: Amines in which the nitrogen atom is bonded to alkyl groups only.
26. **Aromatic Amines**: Amines in which the nitrogen atom is directly attached to an aromatic ring, like aniline.
27. **pK_a (pKb)**: A measure of the basicity of amines; smaller pKb indicates a stronger base.
28. **Benzoylation**: The reaction of amines with benzoyl chloride to form benzamides.
29. **Nomenclature**: The naming system of amines based on the IUPAC rules, where primary amines are named as alkanamines.
30. **Tollens' Test**: A test for the presence of primary amines where they reduce ammoniacal silver nitrate solution, forming a silver mirror.