This reaction goes by an **elimination - addition** pathway and it involves a high-energy intermediate known as **benzyne**.
Elimination–Addition (Benzyne) Reactions of Bromoanisole Isomers with Sodium Amide in Liquid Ammonia

NaNH\textsubscript{2} is a very strong base. The elimination process follows the [E1cb] pathway. [Ad\textsubscript{N}] to benzyne is favorable because a triple bond in a 6-membered ring causes considerable strain.
Summary

• The S\textsubscript{N}2 mechanism is not an option for substitution at C(sp\textsuperscript{2})–X σ bonds.

• Under very strongly basic conditions, halobenzenes undergo β-elimination to give benzynes, compounds that are highly strained and very reactive. Substitution takes place by a two-step process involving: (1) β-elimination and (2) nucleophile addition.

• π bonds in aromatic compounds that are substituted with electron-withdrawing groups are electrophilic (i.e., they have a low-energy π* LUMO); thus, they are prone to attack by nucleophiles under basic conditions. When a good leaving group is present, substitution takes place by a two-step process involving: (1) nucleophile addition and (2) elimination of a suitable leaving group.

• The NH\textsubscript{2} group of arylamines can be replaced by a variety of other groups after transforming the amine to an aryldiazonium ion. The large driving force (i.e., due to formation of the stable byproduct, N\textsubscript{2}) accounts for the formation of the high-energy aryl cation intermediate.