If electrophilic aromatic substitution of a monosubstituted benzene is slower than that of benzene under identical conditions, the substituent in the monosubstituted benzene is called a deactivating group.

eg:

Under identical conditions, Reaction 2 is slower than Reaction 1. Thus, the nitro group is a deactivating group.

All deactivating groups are electron-withdrawing groups.

Common deactivating groups:

\[ \text{---NO}_2 \]

\[ \text{---NO} \]

\[ \text{---NR}_3 \text{ (R = H, alkyl, aryl, or any combination thereof)} \]

\[ \text{---C}=R \text{ (R = H, alkyl, aryl, hydroxy, alkoxy, phenoxy, NH}_2\text{)} \]

\[ \text{---X} \text{ (X = F, Cl, Br, I)} \]

\[ \text{---CN} \]

\[ \text{---SO}_3\text{H} \]

see also activating group, ortho, para directing group, meta directing group

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