A ylide is a neutral species in which there is a carbon atom bearing a formal charge of -1 bound to a heteroatom bearing a formal charge of +1. Ylides are classified based on the nature of the positively charged heteroatom. E.g.:

- Ph₃⁺ –— CH₂
  a phosphorus ylide

- (CH₃)₂S –— CH₂
  a sulfur ylide

- (CH₃)₂N –— CH₂
  a nitrogen ylide

Some ylides are resonance stabilized due to pπ-dπ interactions. E.g.:

\[
\text{Ph}_3^+ \overset{\text{Ph}}{\text{CH}_2} \quad \longleftrightarrow \quad \text{Ph}_3^\text{N} = \text{CH}_2
\]

Some are by delocalization of the lone pair on the negatively charged carbon atom to a pi bond. E.g.:

\[
\text{(CH₃)₂N} \quad \overset{\text{N}}{\text{CH}_2} \quad \overset{\text{Ph}}{\text{Ph}} \quad \longleftrightarrow \quad \text{(CH₃)₂N} \quad \overset{\text{N}}{\text{CH}_2} \quad \overset{\text{Ph}}{\text{Ph}}
\]

Some are by both. E.g.:

\[
\text{(CH₃)₂N} \quad \overset{\text{N}}{\text{CH}_2} \quad \overset{\text{Ph}}{\text{Ph}} \quad \longleftrightarrow \quad \text{(CH₃)₂N} \quad \overset{\text{N}}{\text{CH}_2} \quad \overset{\text{Ph}}{\text{Ph}}
\]

Others are not resonance stabilized. E.g.:

\[
\text{(CH₃)₃N} \quad \overset{\text{N}}{\text{CH}_2}
\]

see also Wittig reagent

Contributors

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