Diazomethane, CH$_2$N$_2$, is a yellow, poisonous, potentially explosive compound, which is a gas at room temperature. The structure of diazomethane is explained using three resonance forms.

\[
\text{CH}_2\text{N} \equiv \text{N} \quad \leftrightarrow \quad \text{CH} = \text{N} \equiv \text{N} \quad \leftrightarrow \quad \text{CH} = \text{N} \equiv \text{N}
\]

**Conversion of carboxylic acids to methyl esters**

Carboxylic acids react with diazomethane to produce methyl esters. Because of the high reactivity of diazomethane, it is produced in-situ and then immediately reacted with the carboxylic acid to produce the methyl ester.

\[
\text{CH}_2\text{COOH} + \text{CH}_2\text{N}_2 \rightarrow \text{CH}_3\text{COOH} + \text{N}_2
\]

The first step of the mechanism is a simple acid-base reaction to deprotonate the carboxylic acid. The carboxylate is then the nucleophile of an $S_N2$ reaction with protonated diazomethane to produce the methyl ester with nitrogen gas as a leaving group. It is important to keep reaction vessels vented when gases are produced to avoid explosions.

**Contributors and Attributions**

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