Radical Halogenation of Alkanes

**Reaction**

\[
\text{CH}_3
\]

\[
\text{Br}_2 / \text{CCl}_4 \text{ light}
\]

\[
\text{Br}_3
\]

**Mechanism**

**Initiation**

\[
\text{Br} \rightleftharpoons \text{Br} \quad \rightarrow \quad 2 \cdot \text{Br}.
\]

**Propagation**

\[
\cdot \text{Br} + \text{CH}_3 \quad \rightarrow \quad \text{CH}_3 + \text{HBr}
\]

planar radical

**Termination**

\[
2 \cdot \text{Br} \quad \rightarrow \quad \text{Br}_2
\]

The reaction can be performed with Cl\(_2\) and Br\(_2\). The alkyl radical formed in the propagation step is the most stable radical. Consequently the order of stability is: 3° > 2° > 1°.