$$(i) \qquad -CH_2 - C^{\oplus} \longleftrightarrow -CH_2 - C \\ \vdots \\ O : \qquad \vdots \\ R \qquad \vdots \\ O \stackrel{\parallel}{\circ}$$

sation of (75ty), the using Sn Cl₄ as catalyst and (1) Isobutylene using BF₃ as catalyst and water as a co-catalyst (or protogen or initiator) since it supplies the proton which ultimately adds to monomer to initiate polymerization. (Note that BF3 alone cannot start the polymerization).

(a) Polymerization mechanism of styrene
$$\begin{pmatrix} CH_2 = CH \\ | \\ \phi \end{pmatrix}$$
 where ϕ stands for C_6 H_5

Initiation: $SnCl_4 + H_2O \longrightarrow [SnCl_4 . OH]^{\Theta} + H^{\Theta}$

$$CH_2 = CH \xrightarrow{H^{\oplus}} CH_3 - C \xrightarrow{\downarrow} \phi$$

$$CH_3 - C \\ \downarrow \\ \phi \\ CH_2 - C \\ \downarrow \\ \phi \\ \end{pmatrix}_{n-1} H \\ \downarrow \\ CH_2 - C \\ \downarrow \\ \phi \\ \end{pmatrix}$$

Termination:
$$CH = CH_2 - CH_2 - CH_2 - CH_3 - CH_2 - CH_3 - CH_$$

$$CH_3 - C + CH_2 - C + H + H^6$$

$$\downarrow \phi \qquad \downarrow \\ \phi \qquad \downarrow \\ \phi \qquad \downarrow \\ h \rightarrow 0$$

(b) Polymerization mechanism of isobutylene

$$BF_3 + H_2O \rightleftharpoons (BF_3 \cdot OH)^-(H)^+$$

$$CH_{2} = C \left\langle \begin{array}{c} CH_{3} \\ \\ CH_{3} \end{array} \right. + H^{+}(BF_{3} . OH)^{-} \iff CH_{3} - C^{\oplus} (BF_{3} . OH)^{\Theta}$$

$$CH_{3} = C \left\langle \begin{array}{c} CH_{3} \\ \\ CH_{3} \end{array} \right.$$

$$CH_{3} = CH_{3} - C^{\oplus} (BF_{3} . OH)^{\Theta}$$

$$CH_{3} = CH_{3} - CH_{3} + CH_{3} - CH_{3} + CH_{3}$$

Propagation:

$$CH_3$$
 CH_3
 CH_3
 CH_3
 CH_3
 CH_3
 CH_3
 CH_3
 CH_3
 CH_3

$$\begin{array}{c|c}
CH_{3} & CH_{3} & CH_{3} \\
CH_{3} - C & CH_{2} - C \\
CH_{3} & CH_{3} & CH_{2} - C \\
CH_{3} & CH_{3} & CH_{3}
\end{array}$$

$$\begin{array}{c|c}
CH_{3} & CH_{3} \\
CH_{2} - C & CH_{3} \\
CH_{3} & CH_{3}
\end{array}$$

Termination:

$$\begin{array}{c}
CH_{3} & CH_{3} \\
CH_{3} - C \\
CH_{3} - C \\
CH_{3} & CH_{2} - C \\
CH_{3} & CH_{2} - C \\
CH_{3} & CH_{3} \\
CH_{3} - C \\
CH_{3} - C \\
CH_{3} & CH_{2} - C \\
CH_{3} & CH_{2} - C \\
CH_{3} & CH_{3} \\
CH_{4} & CH_{5} \\
CH_{5} &$$