Why do we often use solvents for organic reactions?

Why would we use ethanol for organic reactions such as the following rather than water (H₂O)?

Which species would be more stabilized by hydrogen bonding?
A. the reactants
B. the transition state.

If the reactants are more stabilized than the transition state will the reaction go (A) faster or (B) slower?
Which of the following halogen ions is most solvated by hydrogen bonding?

- Increasing solvation energy
- A
- B
- C

If hydrogen bonding cannot occur which halogen would be predicted to react the fastest in non hydrogen bonding solvents?

- Increasing reactivity
- A
- B
- C

If hydrogen bonding is very important which halogen would be predicted to react the fastest in hydrogen bonding solvents?

- Increasing reactivity
- A
- B
- C

Which solvent would cause the following SN2 reaction to occur at a faster rate?

- A
- B
- C

- solvent
What effect would hydrogen bonding be on the rate of this $S_N2$ reaction?

Do dipolar, aprotic solvents solvate the reactants (nucleophiles)?

What is the role of the solvent in performing chemical reactions?

Would hexane be a good solvent for this reaction?

A. yes  B. no. Why?
NaCN has no solubility in hexane. Why?

What is the mechanism of the following reaction?

A. SN1   B. SN2   C. E1    D. E2

What are the products of the following reaction?

What product is formed in 17% yield?
What product is formed in 17% yield?

What is the mechanism of the following reaction?

A. SN1  B. SN2  C. E1  D. E2
What is the mechanism of the following reaction?

If the temperature is increased which product yield increases? Why?

Why is the transition state *anti*-co-planar?

Would you expect the yield of substitution product to (A) increase or (B) decrease when 1° alkyl bromide is used?
Would you expect the yield of substitution product to (A) increase or (B) decrease when the base is t-butoxide ion?

\[
\begin{array}{c}
\text{R} = \text{C}_6\text{H}_{13} \\
\text{R} = \text{C}_8\text{H}_{13} \\
\text{R} = \text{C}_6\text{H}_{13}
\end{array}
\]

\[
\begin{array}{c}
\text{CH}_3\text{OH} \quad \text{CH}_3\text{OH} \quad \text{CH}_3\text{OH} \\
\text{CH}_2\text{OH} \quad \text{CH}_2\text{OH} \quad \text{CH}_2\text{OH} \\
\text{CH}_2\text{OH}
\end{array}
\]

1% | 99%
85% | 15%

The following alkyl chloride reacts rapidly in both $S_N$1 and $S_N$2 reactions. Why?

Why are $S_N$2 reactions fast? 1° alkyl chloride

Why are $S_N$1 reactions fast?

Reacts rapidly in both $S_N$1 and $S_N$2 reactions.

The following tertiary alkyl bromide is unreactive in $S_N$1 reactions. Why?

A. steric effects
B. electronic effects

Give the name of the major product of the following reaction.

1° alkyl chloride

$S_N$1

$S_N$2
Which of the following alkyl bromides would you predict to react faster? Why?

A

\[
\text{EICH}_2\text{Br} \\
\text{solvolysis}
\]

B

\[
\text{EICH}_2\text{Br} \\
\text{solvolysis}
\]

Why does the following E2 reaction give the less stable alkene?

\[
\text{EICH}_2\text{Br} \xrightarrow{\text{ECl}_2} \text{not} \\
\text{major alkene product} \\
\uparrow \text{no E2 possible}
\]