

Chem!stry

Name: ()

Class:

Date: / /

Electrophiles and Nucleophiles in Organic Reaction Mechanisms

The suffix *-phile* originates from the Greek language and means, "To love or have a strong affinity for something."

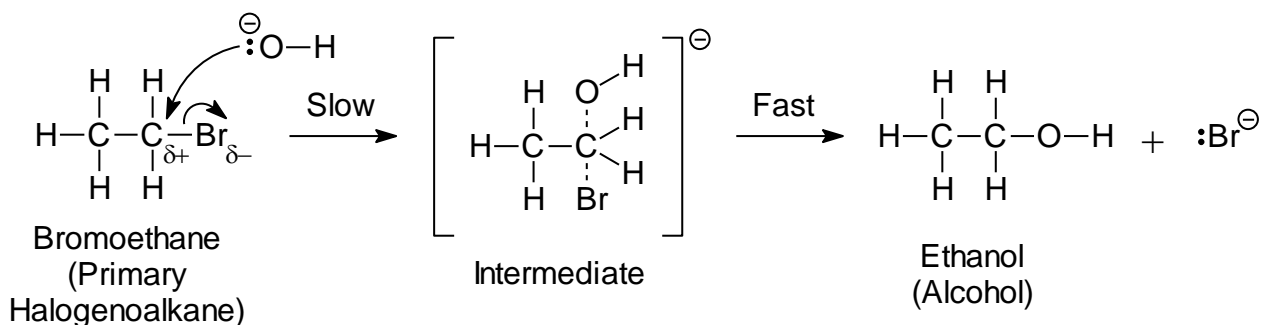
- 1) Identify the type of charge that an *electrophile* is attracted to and hence define the term *electrophile*. Illustrate your answer with examples of the appropriate ions and polar covalent molecules:

.....
.....

- 2) Identify the type of charge that a *nucleophile* is attracted to and hence define the term *nucleophile*. Illustrate your answer with examples of the appropriate ions and polar covalent molecules:

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.....

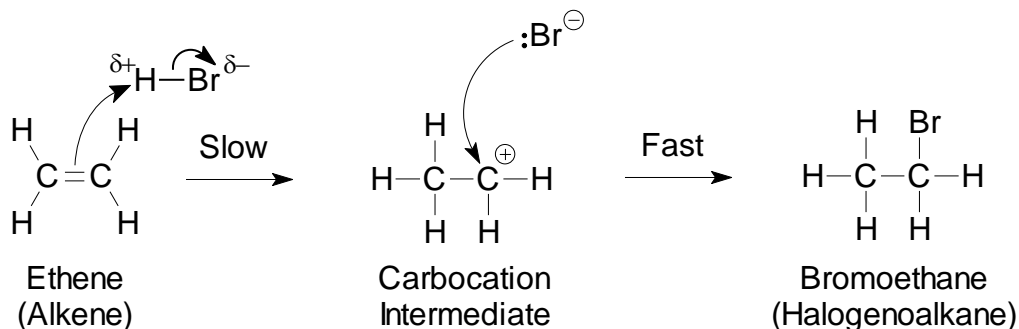
If the charge on an ion or the polarity of a covalent bond is known, then it is possible to classify the attacking species in an organic reaction as either an *electrophile* or a *nucleophile*. For example, in the following substitution reaction the negatively charged hydroxide ion is attracted towards the δ^+ carbon atom of the bromoethane molecule (for an explanation of why the carbon atom carries a slight positive charge, review your understanding of *electronegativity values* and *bond polarity*). Because the hydroxide ion is attracted towards a region of positive charge, it is described as a *nucleophile* and so the overall reaction is classified as *nucleophilic substitution*.



Note: In an organic reaction mechanism, a curved arrow (e.g.) is used to show the movement of a pair of electrons.

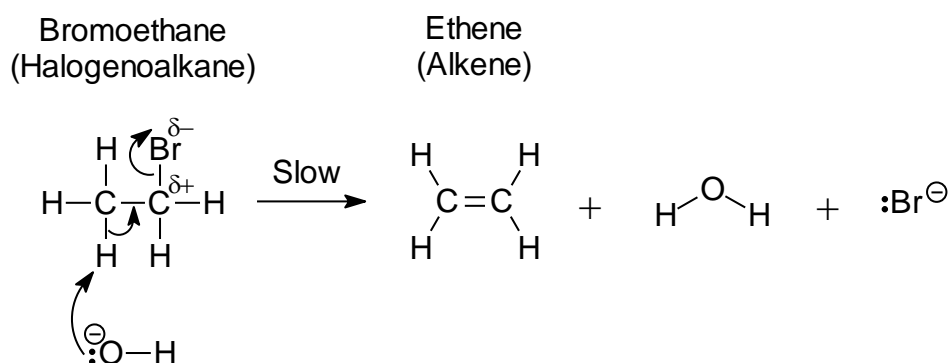
- Use the terms *electrophilic* and *nucleophilic* in combination with *addition*, *elimination* and *substitution* to classify the two organic reactions shown below:

3)



Classification of reaction type:

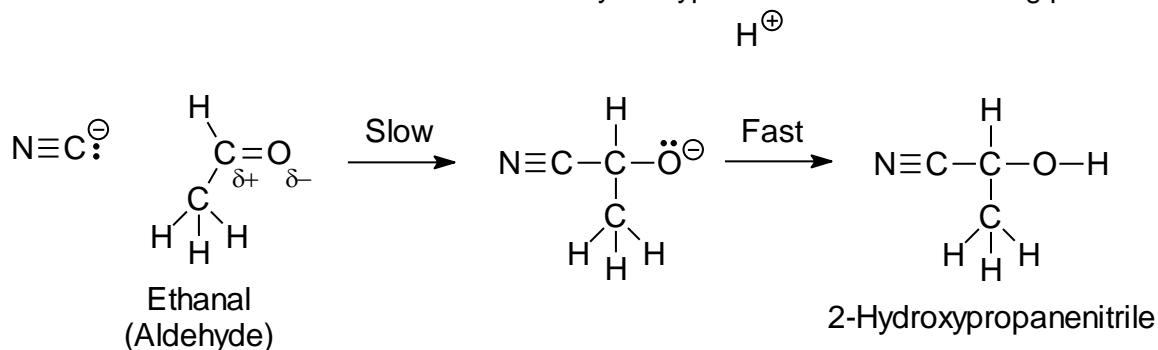
4)



Classification of reaction type:

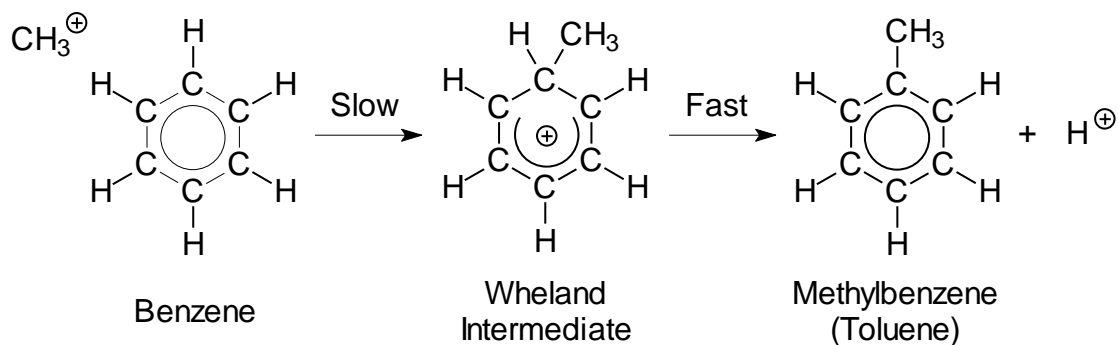
- Use curved arrows to indicate the movement of electron pairs and hence complete the two organic reaction mechanisms shown below. Identify the type of reaction that is taking place:

5)



Classification of reaction type:

6)



Classification of reaction type: