



Cornell University

Unsaturation Number & Introduction to Retrosynthesis

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OCSP Lecture #9

Lecture 9 Learning Objectives

- Unsaturation Number
 - Two Potential Equations
- Introduction to Retrosynthesis

Unsaturation Number

Unsaturation Number (also known as Degree of Unsaturation): Indicates the total number of pi bonds and rings within a molecule which makes it easier to figure out the molecular structure just from the molecular formula.

- So, how can we calculate the D of U from just the molecular formula?

Equation 1 for Unsaturation Number

Equation 2 for Unsaturation Number

Key Point: You may be given either equation so try to be comfortable with both (but you can have a preference). Whenever you're given a molecular formula (with no molecular structure), calculate D of U.

Introduction to Retrosynthesis

Synthesis: A series of two or more reactions designed to obtain a specific final product

- The secret to synthesis/retrosynthesis problems...
 1. Look for patterns:
 1. When you are stuck, remember there is usually more than one way to get to the product!

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 2. What functional group is present on the product?
 3. What reactions do I know to convert one to the other?
 4. Are there any reactants that produce intermediates to the given product?
 5. Pay attention to regio- and stereochemistry.

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Retrosynthesis: Example 1

Retrosynthesis: Example 2

Retrosynthesis: Example 3

Retrosynthesis: Example 4