Frost Circles

Transcript

Instructor: Jessie Key

00:00:00:00 - 00:00:18:04
Instructor: Hello, again, Doctor Jessie Key here. In this video, you'll be exploring the use of frost circles to approximate molecular orbital diagrams for assessing aromaticity of conjugated cyclic systems. Let's take a look at an example of how we can draw a frost circle for a conjugated three membered ring.

00:00:18:04 - 00:00:36:16
Instructor: Follow along with a pen and paper. For a conjugated three membered ring, first draw the three membered ring, point the end down and encircle it. Next, at each place where the three membered ring touches the circle, draw a horizontal line which represents a molecular orbital.

00:00:38:11 - 00:01:04:30
Instructor: Then draw a dash line horizontally at the middle of the circle and place an energy Y axis beside your figure. A orbital drawn below the horizontal line corresponds to a bonding molecular orbital. Orbitals exactly at the horizontal line correspond to non bonding molecular orbitals.

00:01:05:70 - 00:01:25:22
Instructor: Orbitals above the horizontal line are anti bonding. For the purposes of this course, it is optional to subsequently erase the three membered ring and circle. But in more formal writing, this would be done to make the image less cluttered.

00:01:30:68 - 00:02:04:14
Instructor: As can be seen in this diagram, with a three membered ring system, there's only one bonding molecular orbital, which when filled would correspond to two Pi electrons. This satisfies Huckel's rule when N is equal to zero, four times zero plus two equals two. Let's try another example, a five membered ring.

00:02:04:14 - 00:02:34:52
Instructor: Draw the five membered ring structure, pointy down, then encircle it and draw lines where the five membered ring touches the circle. Finally, draw in the horizontal line at the midpoint of the circle and add an energy axis. As can be seen in this diagram, with a five membered ring system, there are three bonding molecular orbitals which when filled would correspond to six Pi electrons.

00:02:34:52 - 00:02:39:08
Instructor: This satisfies Huckel's rule when N is equal to one.