

Guided-Inquiry Chemistry Activity

Oxidation-Reduction Reactions in a Lithium-ion Electric Car Battery

This activity is based on the oxidation-reduction reactions topics that were covered in the interactive PowerPoint lectures.

Model: Open the Chemistry Energy Augmented Reality (AR) app.

See attached instructions for how to download the AR app for both Apple (iOS) and Android devices and instructions for how to access and use the AR app once it is downloaded to your device.

Critical Thinking Questions

1. Oxidation involves _____ of electrons.
2. Reduction involves _____ of electrons.
3. Oxidation occurs at the _____.
4. Reduction occurs at the _____.
5. When the lithium-ion battery in the electric car is charging, there is a _____ of electrons.
6. When the lithium-ion battery in the electric car is losing charge, there is a _____ of electrons.
7. When the lithium-ion battery in the electric car is charging, in which direction do the lithium ions flow in terms of cathode and anode?
8. When the lithium-ion battery in the electric car is losing charge, in which direction do the lithium ions flow in terms of cathode and anode?

9. When the electric car drives up a hill, there is a _____ of electrons.
10. When the electric car drives down a hill, there is a _____ of electrons.

11. When the electric car drives up a hill, is the car charging, losing charge, or the charge (battery level) remains the same (remains unchanged)?
12. When the electric car drives down a hill, is the car charging, losing charge, or the charge (battery level) remains the same (remains unchanged)?

Challenge Questions:

1. Write the reduction half-reaction for the lithium-ion battery in an electric car.
2. Write the oxidation half-reaction for the lithium-ion battery in an electric car.
3. Write the overall reaction for the lithium-ion battery in an electric car.

4. What enables the lithium-ion battery in an electric car to be rechargeable?