GREEN REVOLUTION

About the Series

Coming up with better ways to get where we need to go and power the lives we live requires development of new technologies, along with research to help us minimize the impact of these technologies on our environment. The overall goal of this series is to encourage people to ask questions and look beyond fossil fuels for innovative solutions to our ever-growing energy needs. Interest in science and technology provides the necessary foundation for our future in a world powered by clean energy. The series also provides insight into what careers in science, engineering and other topics related to clean energy technologies are really like.

In this Episode

Host Lisa Van Pay meets with NSF-funded scientists Yang-Shao Horn and Yogi Surendranath at the Massachusetts Institute of Technology as they take on the hydrogen energy challenge. Hydrogen bonds are an extremely efficient way to store energy, and scientists would like to capture this energy to power all sorts of things–from cars to laptops.

Unlike other fuel sources, hydrogen can't be harvested easily, so we have to make it. Surendranath tries to figure out how we can harvest and use the energy stored in hydrogen bonds without wasting a lot of energy in the process, while Horn looks at how we can build a better fuel cell. From the importance of developing an effective catalyst to speed up electrolysis, to the construction and operation of the fuel cell, this episode demonstrates that sometimes it only takes a little to do a lot.

Concepts

- Atoms bond with each other by transferring or sharing valence electrons to form compounds.
- Rates of reaction and chemical equilibrium are dynamic processes that are significant in many systems (e.g., biological, ecological, geological).

Content Standards

Chemistry
High School*

1.2 Explain the difference between pure substances (elements and compounds) and mixtures.
4.1 Explain how atoms combine to form compounds through both ionic and covalent bonding.
7.5 Identify the factors that affect the rate of a chemical reaction (temperature, mixing, concentration, particle size, surface area, catalyst).

*Based on Massachusetts Science and Technology/Engineering Curriculum Framework, October 2006