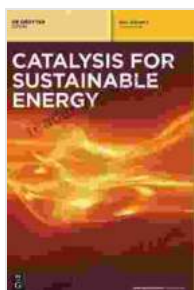


Materials For Sustainable Energy



Materials for Sustainable Energy (ISSN Book 72)

by Kurt Fischer

★★★★★ 5 out of 5

Language : English

File size : 132108 KB

Text-to-Speech : Enabled

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Print length : 450 pages



A Comprehensive Guide

Materials For Sustainable Energy is a comprehensive guide to the materials used in sustainable energy applications. The book covers a wide range of topics, including the properties of different materials, their performance in different applications, and their environmental impact.

The book is divided into three parts. The first part provides an overview of the field of sustainable energy and the materials used in these applications. The second part covers the properties of different materials, including their electrical, thermal, and mechanical properties. The third part discusses the performance of different materials in different applications, such as solar cells, wind turbines, and batteries.

Materials For Sustainable Energy is a valuable resource for researchers, engineers, and policymakers working in the field of sustainable energy. The book provides a comprehensive overview of the materials used in these

applications, and it can help readers to make informed decisions about which materials to use in their own projects.

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Renewable energy sources, such as solar, wind, and biomass, are becoming increasingly important as a way to reduce our dependence on fossil fuels and to mitigate climate change. However, the materials used in renewable energy technologies can have a significant environmental impact. For example, the production of solar cells requires the use of toxic chemicals, and the disposal of wind turbine blades can be a challenge.

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Materials for Solar Energy

The most common type of solar cell is the silicon solar cell. Silicon is a semiconductor material that absorbs light and generates an electrical current. Solar cells are typically made of thin wafers of silicon that are coated with a light-absorbing material.

Other materials that are used in solar cells include gallium arsenide, cadmium telluride, and copper indium gallium selenide. These materials have different properties than silicon, and they can be used to make solar cells that are more efficient or cheaper than silicon solar cells.

The materials used in solar cells have a significant impact on the efficiency of the solar cell. The efficiency of a solar cell is measured as the percentage of light that is converted into electricity. The efficiency of silicon solar cells is typically around 20%. This means that for every 100 watts of light that hits a silicon solar cell, 20 watts of electricity is generated.

The materials used in solar cells also have a significant impact on the cost of the solar cell. Silicon is a relatively expensive material, so silicon solar

cells are more expensive than solar cells made from other materials. However, silicon solar cells are also more efficient than solar cells made from other materials, so they can generate more electricity for the same cost.

Materials for Wind Energy

The most common type of wind turbine is the horizontal-axis wind turbine. Horizontal-axis wind turbines have a rotor that is mounted on a tower and rotates around a horizontal axis. The rotor is made of blades that are attached to a hub. The hub is connected to a generator that converts the rotational energy of the rotor into electricity.

The materials used in wind turbines have a significant impact on the efficiency of the wind turbine. The efficiency of a wind turbine is measured as the percentage of wind energy that is converted into electricity. The efficiency of horizontal-axis wind turbines is typically around 40%. This means that for every 100 watts of wind energy that hits a horizontal-axis wind turbine, 40 watts of electricity is generated.

The materials used in wind turbines also have a significant impact on the cost of the wind turbine. Steel is a relatively inexpensive material, so steel wind turbines are less expensive than wind turbines made from other materials. However, steel is also a heavy material, so steel wind turbines are not as efficient as wind turbines made from other materials.

Materials for Biomass Energy

Biomass energy is generated from organic materials, such as wood, crops, and animal waste. Biomass energy can be used to generate electricity, heat, or transportation fuels.

The most common type of biomass energy is wood. Wood can be burned directly to generate heat, or it can be converted into other fuels, such as charcoal or wood pellets. Biomass energy can also be generated from crops, such as corn and sugarcane. These crops can be converted into biofuels, such as ethanol and biodiesel.

The materials used in biomass energy systems have a significant impact on the efficiency of the system. The efficiency of a biomass energy system is measured as the percentage of biomass energy that is converted into electricity, heat, or transportation fuels. The efficiency of biomass energy systems is typically around 30%. This means that for every 100 watts of biomass energy that is input into a biomass energy system, 30 watts of electricity, heat, or transportation fuels is generated.

The materials used in biomass energy systems also have a significant impact on the cost of the system. Wood is a relatively inexpensive material, so wood biomass energy systems are less expensive than biomass energy systems made from other materials. However, wood is also a bulky material, so wood biomass energy systems are not as efficient as biomass energy systems made from other materials.

Materials for Geothermal Energy

Geothermal energy is generated from the heat of the Earth's interior. Geothermal energy can be used to generate electricity, heat, or transportation fuels.

The most common type of geothermal energy is hydrothermal energy. Hydrothermal energy is generated from hot water that is found

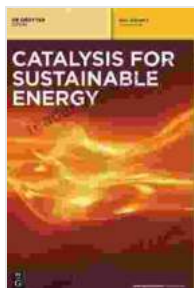
underground. Hot water can be used directly to generate heat, or it can be converted into steam to generate electricity.

The materials used in geothermal energy systems have a significant impact on the efficiency of the system. The efficiency of a geothermal energy system is measured as the percentage of geothermal energy that is converted into electricity, heat, or transportation fuels. The efficiency of geothermal energy systems is typically around 20%. This means that for every 100 watts of geothermal energy that is input into a geothermal energy system, 20 watts of electricity, heat, or transportation fuels is generated.

The materials used in geothermal energy systems also have a significant impact on the cost of the system. Steel is a relatively inexpensive material, so steel geothermal energy systems are less expensive than geothermal energy systems made from other materials. However, steel is also a corrosive material, so steel geothermal energy systems require more maintenance than geothermal energy systems made from other materials.

Materials for Hydropower Energy

Hydropower energy is generated from



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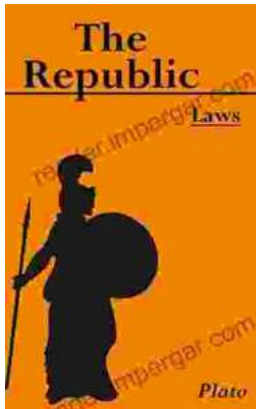
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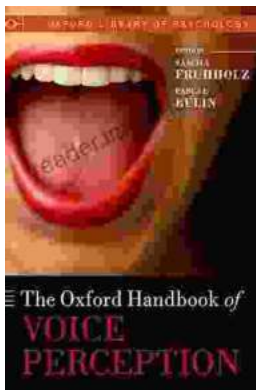
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