Essay on plant and solar cells

Environment, Water

Plant and Solar cell

The sun plays an extremely vital role in sustaining the life on earth, exhibited through the emission of solar energy that aids in the cycling of matter, and maintenance of gravity (Miller & Spoolman, 2007). The solar energy reaches the earth through radiation. It flows through the biosphere, warms the atmosphere, evaporates, recycles water, generates winds and support plant growth (Miller & Spoolman, 2007). Further, the energy from the sun also supports photosynthesis, the process by which green plants use natural light to make compound such as carbohydrates that maintain their lives also feed other organisms (Miller & Spoolman, 2007). On the other hand, with the advancement of technology, and rapid development of electronic gadgets, the solar energy has been harnessed and converted to electricity, which is an indispensable facet in the lives of human.

The solar cell and plant cell systems have a lot of similarities in their respective modes of operation or mechanism. The most obvious similarity is that both cells use sunlight in their modes of operation. In light with this, both cells also convert sunlight energy into other, different forms of energy. In plant cell, the light is absorbed by a pigment known as chlorophyll, which absorbs blue and red wavelengths of light. The conversion of light energy to chemical energy in the form of ATP and NADPH takes place during the light reaction, which is the first stage of photosynthesis (Wayne, 2009). The chemical energy is then later converted to a stable form of energy, carbohydrates (C[H2O]), which takes place in dark reaction, the second phase of photosynthesis (Wayne, 2009). In solar cell, there is the conversion of light energy to electrical energy through photovoltaic energy conversion process. The process entails direct production of electrical energy inform of current and voltage from electromagnetic- lighting, including infrared, visible, and ultraviolet-energy (Fonash, 2010).

Another similarity is that, in both plant and solar cells, there is dislodge and transfer of electrons. In plant cell, the light energy ejects the electrons from a photo-system, which in turn pulls electronic replacement from water molecules that break apart into oxygen and hydrogen ions. The formed electrons then enter electron transfer chain in the thylakoid membrane (Wayne, 2009). On the other hand, in solar cell, there is the excitement of the absorber material, which amounts to the generation of free positive and negative-charge carrier pair. The energetic, photo-generated negative charge carriers arrive at the cathode, amounting to movement of electrons in an electric circuit (Fonash, 2010). In tandem to this, photosynthesis process in most plants occurs in the leaf. The leaves contain the plant cells, and they are normally flat, and thin, thence, creating a maximum surface area (Wayne, 2009). Similarly, many solar cells packed together form solar modules or panels, which increase the surface area for sun exposure (Fonash, 2010).

Besides, laws of thermodynamic can be used in the explanation of energy conversion and conservation in both plant and solar cells. The first law of thermodynamics clearly affirms that energy is transformed from one form to another, and not created nor destroyed. This is exhibited in both plant and solar cells, in which light is converted to chemical energy in plant cells (Wayne, 2009), and into electrical energy in solar cells. The second law of thermodynamics states that the amount of energy available to do work is lessened to some degree by each conversion (Wayne, 2009). This is also displayed in both plant and solar cell, where there is the production of heat energy, during energy conversion.

Conventionally, there also exist considerable differences between the two cells. In plant cells, the energy forms are stored in the cells in the form of carbohydrates (C[H2O]), which takes place in dark reaction, the second phase of photosynthesis (Wayne, 2009). In solar cells, the energy is stored in batteries, which are external devices, not found in the cells (Partain & Fraas, 2010). In addition to this, the plant cells are organic, and capable of self repair and replication, unlike the solar cells, which are inorganic, and largely depend on the human technology for repair, modification and replication. Moreover, in plant cells, there is the conversion of light energy to chemical energy in the form of ATP and NADPH (Wayne, 2009), whereas, in the solar cell, the same light energy is converted to electrical energy (Fonash, 2010).

In line with this, the light from the sun also enhances transpiration, through the control of opening and closing of the stomata. The process is particularly crucial, as it allows an efficient process of photosynthesis, also the movement of moisture in and out of the leaf, thus contributing to the moisture recycles (Wayne, 2009). However, the solar cells, never contribute to moisture recycling since the cells are always dry, and there is no process in the cell that amounts to the production of moisture. The solar cells also tend to corrode, when exposed to wet climate, and this reduces their functionalism, and in turn making it expensive in terms of maintenance (Fonash, 2010). The plant cells are natural, and they display minimal effects, with the change of climate or weather patterns.

Concisely, both plant and solar cells play vital roles in the physical environment. Photosynthesis takes part in plant cells and the process aids in production of food materials that are pertinent to other organism. Further, the process of transpiration also helps in the moisture recycling. The solar cells also convert light energy, which can be, used in lighting and other applications, thence, substituting other forms of energy like organic.

References

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