Bethina P, J Fashion Technol Textile 2023, 11:2

Journal of Fashion Technology & Textile Engineering

Short Communication

A SCITECHNOL JOURNAL

Applications of Photovoltaic Cells in Textile Engineering

Palen Bethina*

Department of Materials Science and Engineering, Texas A&M University, Texas, USA

***Corresponding author:** Palen Bethina, Department of Materials Science and Engineering, Texas A&M University, Texas, USA; E-mail: palenbethina@gmail.com

Received date: 22 March, 2023, Manuscript No. JFTTE-23-99167;

Editor assigned date: 24 March, 2023, PreQC No. JFTTE-23-99167(PQ);

Reviewed date: 15 April, 2023, QC.No JFTTE-23-99167;

Revised date: 22 April, 2023, Manuscript No. JFTTE-23-99167(R);

Published date: 28 April, 2023, DOI: 10.4172/2329-9568.1000301.

Description

As the world seeks sustainable energy solutions, photovoltaic cells have emerged as a game-changing technology. Traditionally used in solar panels, photovoltaic cells are now finding their way into the field of textile engineering, blending renewable energy generation with the functionality and versatility of fabrics. Photovoltaic cells, commonly known as solar cells, are semiconductor devices that convert sunlight directly into electrical energy. They are made up of thin layers of materials, such as silicon, that exhibit the photovoltaic effect [1]. When sunlight strikes the cell, the photons in the light energy knock electrons loose from the atoms, generating an electric current. The integration of photovoltaic cells into textiles opens up exciting possibilities for harnessing solar energy in a more wearable and accessible manner [2]. Textile engineers have been working on incorporating photovoltaic cells into fabrics, resulting in the creation of solar textiles or solar fabrics. These solar textiles feature flexible photovoltaic cells that are woven or printed onto the fabric, allowing the textiles to generate electricity from sunlight. The cells can be seamlessly integrated into various types of fabrics, including clothing, tents, awnings, and even backpacks. Although photovoltaic is the most advanced method of producing electricity far from any mains source, it is limited by ambient light intensity. However, the energy requirement of portable gadgets has dropped to the point that clothing-integrated solar cells can now power the majority of mobile electronics [3, 4].

Benefits

Sustainable energy generation: By incorporating photovoltaic cells into textiles, can tap into the power of the sun and generate clean, renewable energy. Solar textiles offer a sustainable alternative to traditional energy sources, reducing reliance on fossil fuels and minimizing environmental impact [5].

Mobile and wearable power generation: Photovoltaic cells integrated into textiles offer the advantage of mobile and wearable power generation. Users can charge their devices, such as smartphones or wearables, by simply wearing or carrying solar-powered garments or accessories [6,7]. This technology provides convenience and independence, particularly in outdoor or remote environments.

Versatile design and functionality: Solar textiles can be designed to blend seamlessly with various fabric types and styles, allowing for versatile applications in fashion, sportswear, and outdoor gear [8]. The integration of photovoltaic cells does not compromise the fabric's aesthetics or functionality, enabling the creation of fashionable, high-performance solar-powered garments.

Applications

Wearable electronics: Solar textiles have shown great potential in powering wearable electronic devices. For example, smart-watches, fitness trackers, or health monitoring devices can be charged using solar-powered textiles, eliminating the need for frequent battery replacements or recharging [9].

Energy harvesting in outdoor gear: Solar textiles can be incorporated into outdoor gear, such as backpacks, tents, or camping gear, to provide a convenient source of power during outdoor activities. Hikers, campers, or outdoor enthusiasts can rely on solar-powered textiles to charge their devices or power small appliances while on the go [10-12].

Building integration: The integration of solar textiles into architectural elements, such as curtains, blinds, or shading structures, allows for energy generation in buildings. This can contribute to the reduction of energy consumption from traditional power sources and promote sustainable practices in urban environments focused on improving the efficiency and durability of photovoltaic cells integrated into textiles engineers are exploring new materials, such as organic or flexible solar cells, that can withstand the rigors of textile production and maintain their performance over time.

References

1. AlBahar B, Lu J, Yang J, Shu Z, Shechtman E, et al (2021) Pose with Style: Detail-preserving pose-guided image synthesis with conditional stylegan. ACM Trans Graph 40(6):1-1.
2. Krizhevsky A, Sutskever I, Hinton GE (2017) Imagenet classification with deep convolutional neural networks. Commun ACM 60(6):84-90.
3. Deng J, Dong W, Socher R, Li LJ, Li K, et al (2009) Imagenet: A large-scale hierarchical image database. Proc IEEE Comput Soc Conf Comput Vis 248-255.
4. Simonyan K, Zisserman A (2014) Very deep convolutional networks for large-scale image recognition. ArXiv 1409.1556.
5. Szegedy C, Liu W, Jia Y, Sermanet P, Reed S, et al (2015) Going deeper with convolutions. Proc IEEE Comput Soc Conf Comput Vis 1-9.
6. He K, Zhang X, Ren S, Sun J (2016) Deep residual learning for image recognition. Proc IEEE Comput Soc Conf Comput Vis 770-778.
7. Hu J, Shen L, Sun G (2018) Squeeze-and-excitation networks. Proc IEEE Comput Soc Conf Comput Vis 7132-7141.
8. Huang Y, Cheng Y, Bapna A, Firat O, Chen D, et al (2019) Gpipe: Efficient training of giant neural networks using pipeline parallelism. Adv Neural Inf Process Syst 32.
9. Howard AG, Zhu M, Chen B, Kalenichenko D, Wang W, et al (2017) Mobilenets: Efficient convolutional neural networks for mobile vision applications. ArXiv 1704.04861.

All articles published in Journal of Fashion Technology & Textile Engineering are the property of SciTechnol and is protected by copyright laws. Copyright © 2023, SciTechnol, All Rights Reserved.

10. Cai H, Zhu L, Han S (2018) Proxylessnas: Direct neural architecture search on target task and hardware. ArXiv 1812.00332.
11. Tan M, Chen B, Pang R, Vasudevan V, Sandler M, et al (2019) Mnasnet: Platform-aware neural architecture search for mobile. Proc IEEE Comput Soc Conf Comput Vis 2820-2828.
12. Tan M, Le Q (2019) Efficientnet: Rethinking model scaling for convolutional neural networks. Proc Int Conf Mach Learn 6105-6114.