

太阳能发电面临的挑战与机遇

Stuart James Curzon Irvine, Anne Stafford

威尔士班戈大学 化学系, 英国 威尔士格温内思郡 LL57 2UW

收稿日期 修回日期 网络版发布日期 接受日期

摘要

在所有可再生能源中, 光伏太阳能只占一小部分, 然而在早期采用它的国家中, 如日本和德国, 却对全球工业体系起到了促进作用, 对未来能源需求产生了意义深远的影响。讨论了光伏模块的当前成本和计划中的成本以及为了拓宽光伏太阳能的应用, 材料科学能够为降低此成本壁垒而作出贡献的途径。文章对当前统辖市场的相对成熟的单晶硅光伏电池和有可能降低光伏模块成本的薄膜光伏电池进行了比较, 指出薄膜光伏电池的转换效率需要提高而且应该能够进行大规模生产。文中给出了当前碲化镉光伏电池材料研究的一些实例, 并对它们应如何在将来进行改进提出了建议。

关键词 [碲化镉; 单晶硅; 光伏太阳能电池; 可再生能源; 太阳能; 薄膜太阳能电池](#)

分类号 [TM615](#)

PV Solar Energy, Challenges and Opportunities

Stuart J. C. Irvine, Anne Stafford

Department of Chemistry, University of Wales Bangor, Gwynedd LL57 2UW, Wales, UK

Abstract

PV solar energy contributes a small part of the current renewable energy mix but early adopter countries such as Japan and Germany have stimulated a global industry that looks set to make a significant impact on future energy needs. The current and projected costs of PV modules are discussed and the ways in which materials science can contribute to reducing this barrier to wider adoption of PV. A comparison is made between the relatively mature crystalline silicon PV cells that currently dominate the market and thin film PV cells that offer the promise of much lower cost PV modules. The thin film cells need to improve in conversion efficiency and be capable of large scale manufacture. Some examples of current materials research in CdTe PV cells is given and suggestions made as to how these will be improved in the future.

Key words [cadmium telluride; crystalline silicon; photovoltaic solar cells; renewable energy; solar energy; thin film solar cells](#)

DOI:

通讯作者

作者个人主页

Stuart James Curzon Irvine; Anne Stafford

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF \(230KB\)](#)
- ▶ [\[HTML全文\]\(OKB\)](#)
- ▶ [参考文献\[PDF\]](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“碲化镉; 单晶硅; 光伏太阳能电池; 可再生能源; 太阳能; 薄膜太阳能电池”的 相关文章](#)
- ▶ 本文作者相关文章
 - [Stuart James Curzon Irvine](#)
 - [Anne Stafford](#)