

Beyond Silicon: Challenges in Emerging Photovoltaic Technologies

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ABSTRACT

Emerging photovoltaic (PV) technologies based on dye sensitized solar cells, organic compounds, perovskite materials and quantum dots have been stimulating intense R&D efforts in academia and industry and attracted significant attention in scientific press. They have also attracted large public as well as venture capital funding across the globe and have spawned many new technology driven start ups, many of which are in the early stages of evolution. The promise of second and third generation PV technologies appear attractive because they are thinner, flexible, work in diffuse light, easy to fabricate, provide unlimited design freedom and may be more inexpensive. This opens up many new applications beyond rooftop and solar-farm panels which dominate silicon based PV applications today.

However, most of these technologies are at a research level with a few start ups trying to create marketable technologies. The journey from the laboratory to market has been painfully slow. In my presentation, I will address the following issues:

1. What features of silicon PV technology are likely to be limiting for emerging PV applications?
2. Current gaps in science and technology of emerging PV technologies
3. Barriers to commercialization of emerging PV technologies
4. Strategies for new product development and application of emerging PV technologies