

Symposium on Manufacturing and Technology for Thin Film Photovoltaics

This symposium focuses on the business and technological aspects of thin film photovoltaics (TFPV). Within the U.S. there is a strong push by the U.S. Government to support photovoltaic (PV) development and manufacturing, with available funds and incentives in excess of \$100 million. Within the U.S., 29 states have legislated renewable energy portfolios, including Illinois, for example, adopting a 25% renewable energy goal by 2025. With the lasting effects of the massive oil spill in the Gulf of Mexico, this seems to be even more reason to favor PV technology. Over the last decade, photovoltaic production had an average growth rate of 44% per year. In 2009 the worldwide production of solar cells grew to 7.5 G Watts, lessening the need for fossil fuel. A 2.5x increase in current production capacity is predicted by 2014. The annual revenue of the solar PV industry is expected to approach \$100 billion by 2014 (SolarBuzz, 2010, <http://www.solarbuzz.com/Marketbuzz2010-intro.htm>). The total TFPV portion of this world capacity is estimated to be about 30% by 2015, which is double current production. TFPV is expected to have the most growth in Japan, U.S. and Europe. For example, FirstSolar beat the world's record for production in 2009 by producing in excess of 1GW CdTe based TFPV devices. Organic thin film devices continue to develop with higher efficiency and longer lifetimes. TFTV has a great need for advanced glass, flexible substrates and new transparent conductors. Our organizing committee welcomes papers in the following areas:

Market and Business

- *International and U.S. movements in the PV Market, future perspectives on the market and where the opportunities are*
- *Identification of key TFPV technology and research subjects, companies to watch, Key R&D Lab developments, challenges for TFPV research teams. What are the most important issues? What processes and equipment need to be developed?*
- *Comparison of TFPV with wafer based silicon*
- *Government programs and future outlook of PV in Germany and other countries in the EU, Japan, Korea, China, and Taiwan*
- *U.S. Manufacturing and PV America Initiatives, manufacturing conversion opportunities*

Materials Technology

- *New materials opportunities, research and development toward higher efficiency and lower cost*
- *CIS/CIGS, CdTe, a-Si, organic technologies*
- *Future high performance third generation TFPV including quantum processes*
- *Comparison of properties and limitations of wafer based silicon to TFPV*
- *Optical, electrical and device structure design and optimization*
- *Optical performance, integrated concentrator design*
- *High performance antireflection and functional coatings*
- *Sealing materials for moisture, oxygen and mechanical damage for both inorganic and organic devices*
- *TCOs-transparent oxides and metal conductor systems*
- *Health concerning processes and materials and recycling issues, the "greening" of solar fabrication processes*
- *Materials cost and future availability, impact of other industry needs*

Fabrication Processes

- *Sputtering and other PVD, CVD*
- *Large area deposition, quality and yield improvements, BIPV glazing, transparent electronics*
- *Substrate requirements and engineered glass and plastic for high performance*
- *Flexible deposition, quality and web handling, flexible electronics*
- *New high speed and high yield processes*
- *Allied processes (atmospheric plasma, ink jet deposition)*

Manufacturing and Equipment

- *Experiences from industry on TFPV manufacturing*
- *Experiences on moving R&D processes to manufacturing*
- *Transition from pilot to full manufacturing design, plant operation and yields, operational issues*
- *Handling and process design, especially for thinner or flexible substrates*
- *Targets, materials and deposition resources for TFPV*
- *QC equipment and process control*
- *Disposal and recycling*

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