Thin Film PV Challenges for Terawatt Production – Emerging Technologies

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As society grows towards using 20 terawatts of energy a year replacing a meaningful fraction of this with renewable energy sources will depend on being able to produce systems at low cost and a very large scale. To meet grid parity at this scale may not be possible with existing technologies. There are some baseline criteria for any of these technologies they must be elementally abundant, processing temperatures must be low and processing time must be short. A number of new technologies are emerging that have the potential to achieve these goals. This includes organic photovoltaics, thin film Si on glass earth abundant PV systems and technologies that promise to be much more efficient using physical phenomenon at the nanoscale. In addition, there is an increasing interest in solar fuels or solar systems with imbedded storage which will be needed for large scale deployment. The technological readiness of these approaches vary widely from the near commercialization of OPV and the dye cell to some approaches that are 20 years out. The talk will provide a snapshot of the current state of the art in these scientific areas and present some of the key basic and applied challenges needed for these technologies to make a substantial contribution worldwide.

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