

Title:	Solar Photovoltaics & Energy Systems		Code:	ChE-600	
Program	EDEY/EDCH	Course type:	Lecture/project	Teaching language:	English

Course description

Topics:

1. The nature of Solar irradiation
2. Thermodynamic efficiency limits in solar energy conversion.
3. Solar thermal energy conversion.
4. Conversion with a band gap: the basics of crystalline semiconductors
5. Structure and performance of crystalline semiconductor solar cells
6. Direct solar-to-chemical conversion with Photoelectrochemical cells
7. Dye-sensitization of wide band gap materials
8. Excitonic solar cells
9. Perovskite and third generation solar cells
10. (Current literature) Advanced strategies and materials for solar energy conversion

Schedule: Tuesday and Thursday, room **BS 260** From 9:15 to 11:00

Date	Lecturer	Topic
27-02-18	Kevin Sivula	The nature of Solar irradiation, thermodynamics of solar energy conversion, solar thermal approaches
01-03-18	Kevin Sivula	Thermodynamics of band-gap based solar energy conversion, the SQ limit
06-03-18	Wolfgang Tress	pn Junctions, Silicon Solar Cells, and III-V materials
08-03-18	Wolfgang Tress	Heterojunction, Organic and Dye Sensitized Solar Cells
13-03-18	Wolfgang Tress	Perovskite and Third Generation Solar Cells
15-03-18	Néstor Guijarro	Solar-to-fuel conversion, motivation and approaches
20-03-18	Néstor Guijarro	Direct solar to fuel with photoelectrochemical and photocatalytic systems
22-03-18	Student presentations	Advanced strategies and materials (Literature Project)
27-03-18	Student presentations	Advanced strategies and materials (Literature Project)
29-03-18	Student presentations	Advanced strategies and materials (Literature Project)

Course project: Presentation on an advanced strategy for solar energy conversion. Select one of the literature papers provided and prepare a 20 min presentation (groups of two) covering the following topics: Background of the material/physical effect/research field of the paper, the main hypothesis and/or goal of the paper, the approach(s) used, a critical analysis of the results/discussion, and finally the outlook of the results/the expected impact on the field.

Required prior knowledge: Dipl-Ing or M.S., including physics, chemistry or materials science

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