# Projects in MENA3200 Energy Materials 2014

In the project you can either work individually or two together.

The project report should be 12 pages (for two working together) and 10 pages for those who will write the report alone (with font 12 and including figures).

It is important to emphasise that the project should address Energy MATERIALS.

**Deadline for reports: Monday 1 December.**

The project reports should be sent to *both* Bjørn Hauback (bjorn.hauback@ife.no) and Truls Norby (truls.norby@kjemi.uio.no) by e-mail (preferably as pdf).

Below is a list of suggestions for some possible titles/themes. You can select from these, modify them if you like, choose similar topics but with different title, or you can also choose another topic (but it should be related to the MENA3200 course).

*When you have made your decision, please send the title and some keywords for your projects (and names of who will work on it) to both of us for the final approval*.

Solar Cell Materials

- Recent development of Si-based solar cell – materials issues

- Organic and polymeric photovoltaics – materials challenges

- Thin film solar cells – materials and performance

- Strategies to increase the efficiency of solar cells

- Third generation solar cells systems – concepts and materials challenges

- How can nanotechnology contribute to the development of a new generation of solar cells?

Materials for hydrogen technology

- Metal hydride batteries – principles and materials choices

- Metal hydrides for smart windows

- How to store hydrogen in hydrogen cars – present technologies and future possibilities (materials aspects).

- Metal hydrides used in compressors – principals and materials

- Hydrogen storage by adsorption – principles and choice of materials

- Hydrogen selective membranes – principles and materials

- Hydrogen used for energy storage in stationary applications – materials challenges

Electrochemical energy conversion

- Hydrogen cars - principles, materials, challenges and solutions.

- High temperature polymer electrolyte fuel cells and electrolyzers

- Intermediate temperature solid-state fuel cells

- Recent developments of PEM fuel cells.

- Recent developments of solid oxide fuel cells.

- Recent developments in batteries for today's electrical and hybrid cars.

- Electrochemical energy conversion for stationary or marine intermittent storage (grid balancing) of electricity from peak renewable energy.