

Project for Master thesis:

Development of novel electrochromic material deposited by vacuum deposition for advanced windows

Overheating in highly glazed building can occur even in central European latitudes. The high solar gain in these buildings can result in excessive use of air conditioning requiring a lot of energy.

Novel windows with dynamic heat gain coefficient can regulate the incoming flux of energy by controlling the transmittance of the windows. Electrochromic materials would offer a solution. They can darken on demand, thus reducing the solar gains. Existing electrochromic materials show drawbacks such as slow transition time, long-term stability, colour...

The goal of this project is to develop and characterize new electrochromic materials. Novel electrochromic coatings are developed, which exhibit a change in optical properties and can be controlled electrically. Such films are deposited by reactive magnetron co-sputtering. Electrochromic oxide films shall be studied in great detail. The electronic and optical properties of these films shall be characterized by methods such as X-ray photoelectron spectroscopy (XPS), UV-visible-infrared spectrophotometry, cyclic voltammetry...

This project offers two different aspects: one in the optimization of deposition parameters to obtain nanocomposite of electrochromic oxides and the other is to develop a method of electrochemical characterization.

We offer:

- an interesting research topic for a master thesis of four to six months
- an interdisciplinary and creative environment for academic research
- well-equipped laboratory with infrastructure for vacuum deposition of thin films and multiple tools for their characterization, scientific and technical introduction and supervision

We demand:

- a good background in physics, nanotechnology, materials science or electrochemistry
- taste for experimental work
- interest in the research topic
- ability for team work

Contact:

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