

## CBC SEMINAR ANNOUNCEMENT

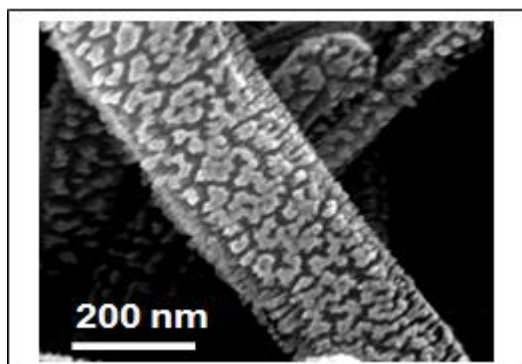


**Professor Vladimir Matolin  
Charles University**

### Hard X- and Soft X- PES Investigation of Nanostructured PEM Fuel Cell Catalysts

Powering of electronic devices by microfabricated power sources, including micro-proton exchange membrane fuel cells (m-PEMFC), are being actually investigated in laboratories world-wide. The possibility of co-fabrication of a power source on the same substrate as the electric circuit offers many advantages, including a reduction in size and weight, increased processing efficiency, and lower cost. The important issue of planar type fuel cells is a preparation of large specific surface area catalysts grown by thin film deposition techniques which are compatible with planar technology.

Recently we showed by fuel cell activity and electron microscopy measurements the possibility of preparation of porous large surface and high activity nanostructured thin film catalysts by depositing the catalysts in form of Pt-Ce-O solid solutions on different carbon substrates by magnetron sputtering. Figure shows example of CNTs coated by the porous Pt-CeO<sub>2</sub> catalyst film. Chemical composition of the films was investigated by x-ray synchrotron radiation photoelectron spectroscopy in soft and hard X ray region. Resonant PES has been performed by measuring Ce 4f resonant profiles of both Ce<sup>4+</sup> and Ce<sup>3+</sup> states. The Pt-doped sputtered cerium oxide films contained high concentration of cationic platinum Pt<sup>2+</sup> and Pt<sup>4+</sup> which were highly active species for hydrogen dissociation to protonic hydrogen H<sup>+</sup>.



**Date:** 12<sup>th</sup> November 2012 (Monday)  
**Time:** 12:00pm – 1:00pm  
**Venue:** NTU SPMS CBC Building Level 2,  
Conference Room  
**Host:** Asst Professor Martin Pumera