

Seminar Series

School of Materials Science and Engineering

Thursday, November 19, 2009

5:00 PM – Room 200 Olin Hall

Electrospun Nanofibrous Materials as X-ray Sources under Atmospheric Conditions

Professor David Lukas

Department of Nonwoven Textiles

Research Centre for Advanced Studies and Technology,

Faculty of Textile Engineering, Technical University of Liberec,

Studentská 2, Liberec 1, 461 17, Czech Republic.

Nanofibrous layers and electrospun jets, with diameters ranging from a few nanometers up to hundred nanometers, can serve as extremely fine electrodes. We will show that asymmetrical capacitors in the form of a nanofiber electrode can generate 15 keV energy X-rays at atmospheric conditions. We hypothesize that the field strength increases to gigantic values in the vicinity of charged nanofibres to form ions and electrons from ambient gas and accelerate them at a short distance comparable with their mean path at atmospheric pressure up to the kinetic energies of detected x-rays. We anticipate this study to be a starting point for intensive investigation into end utilization of this kind of particle accelerator working on short distances.

Biography: Professor Lukas, is the Head of the Department of Non Woven Textiles at the Technical University of Liberec, Czech Republic. He graduated in 1982 with MS degree in physics from Charles University in Prague, Prague, and received his PhD degree and then his Doctor of Science degree from Technical University of Liberec. From 1996-1997, he served as Provost and from 1997-2002 as President of the Technical University of Liberec. His interests lie in physics of fibrous materials and recently he became involved in the exciting field of nanofiber formation by electrospinning. He is one of the inventors of NanoSpider (Elmarco), the first instrument producing nanofibrous mats with an industrial yield of nonwoven materials.