

Title: Thin films of plasma polymers as stable supports for biomedical applications

Author: Ivan Gordeev

Institute: Charles University in Prague, Department of Macromolecular Physics

Supervisor of the doctoral thesis: Doc. Ing. Andrey Shukurov, Ph.D, Charles University in Prague, Department of Macromolecular Physics.

Abstract:

Plasma polymers have been widely considered for use as bio-active coatings. In biomedicine, the surfaces that withstand accumulation of biofilms are of particular importance. This thesis is focused on development of new plasma-based methods for deposition of bio-resistant (non-fouling) plasma polymers. Poly(ethylene oxide) was the subject material. R.f. magnetron sputtering, plasma-assisted thermal vapour deposition and amplitude modulated atmospheric pressure surface dielectric barrier discharge were the methods adapted to fabricate thin films with tunable chemical composition, cross-link density and biological response. A new insight was gained into the processes of plasma polymerization as well as into composition/structure relationship and its effect on biological properties of resultant films.

Keywords: plasma polymerization, PEO, ‘non-fouling’ properties, protein adsorption, cell adhesion