

Title: Modification of polymeric substrates by means of non-equilibrium plasma

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Abstract: Processing of polymeric materials by means of non-equilibrium plasma is a topic that reaches increasing attention, which is due to the wide range of possible applications. As an example can be mentioned processing of polymeric foils used for food packaging, where plasma treatment enables to improve their functional properties (e.g. increase their printability or enhance their barrier properties). In the frame of this PhD. thesis two different strategies suitable for the modification of polymeric materials were followed. The first one was based on treatment of polymers by atmospheric plasma. The main attention was devoted to the investigation of influence of atmospheric pressure plasma on surface properties of 8 commonly used polymers, namely on their chemical composition, morphology and wettability. In addition, it was observed that plasma treatment causes also alteration of their mechanical properties, may lead to their substantial etching and in some cases improves their biocompatibility. The second studied strategy was based on coating of polymers with thin functional nanocomposite films based on metal nanoparticles. Coatings with controllable antibacterial character, tailor-made wettability or with improved barrier properties were developed.

Keywords: dielectric barrier discharge, plasma treatment, nanoparticles, nanocomposite thin film, plasma polymer, antibacterial surfaces.