Surface Functionalization of Polyvinyl Chloride (PVC) by Plasma Immersion Techniques

[1]Péricles L. Sant'Ana; [1]José Roberto R. Bortoleto; [1]Nilson C. Cruz; [1]Elidiane C. Rangel; [1]Steven F. Durrant; [2]Wido Schreiner

[1] Technological Plasmas Laboratory (State University of Sao Paulo, UNESP, Brazil)
[2]Physics Department (Federal University of Parana, UFPR, Brazil)

Abstract

In this work we discussed the wettability, chemical composition, surface morphology and optical transmittance of Polyvinyl Chloride (PVC) samples, treated by Plasma Immersion techniques. Wettability of samples was analysed via Contact angle measurements θ, which, pointed out to either a hydrophobic or hydrophilic values, depending on the plasma composition. XPS analysis confirmed the high presence of fluorine on the PVC surface after treatments using SF_6 plasmas, and high presence of oxygen after treatments using N_2 plasmas. AFM images showed that the roughness Rrms, depends on the plasma conditions (parameters related to the rf power and technique applied to the Plasma System. The optical transmittance, T (λ), was increased by plasma immersion in the visible region. The most value of θ observed was 142º, while the highest optical transmittance was 85% at visible light.
Keywords — *Polyvinyl Chloride, Surface Functionalization, Plasma Immersion techniques.*

Professional Biography

Péricles Lopes Sant'Ana is Production Engineering (Federal University of Viçosa, Minas Gerais State, Brazil – 2007), Master and Doctor in Materials Science and Technology (State University of Sao Paulo, Brazil). He has 10 years in Research and Development, working with Plasma Surface Treatment and Thin Films Deposition for Food Packaging and Optical Devices. Recently he developed PVC, PET and LDPE polymers using Plasma Immersion Techniques, reaching good surface properties combination of Wetting, Roughness, Optical Transmittance and Barrier Properties, in which are useful for Biotechnology, Food Packaging, Sensors and Devices, medicine and others important applications.



Email: drsantanapl@gmail.com