3rd Asia-Pacific Conference on Plasma Physics, 4-8,11.2019, Hefei, China

Surface Modification of Polymers and Textiles by Atmospheric Pressure Argon Glow Discharge

R. B. Tyata[1], D. P. Subedi[2], A. Huczko[3], C.S.Wong[4]
[1]Department of Physics, Khwopa College of Engineering, Bhaktapur-2, Nepal
[2]Department of Natural Sciences (Physics), Kathmandu University, Dhudikhel, Nepal
[3]Department of Chemistry, Warsaw University, Warsaw, Poland
[4]Plasma Technology Research Centre, Physics Department, University of Malaya, 50603 Kuala Lumpur, Malaysia
e-mail (speaker): rbtyata@yahoo.com

Abstract
The aim of the present work was the study of the surface modification of polymers and textiles in order to improve their hydrophilic properties. Atmospheric pressure argon glow discharges were applied for the surface modification of four different types of polymers low density polyethylene (LDPE), polypropylene (PP), polyethylene terephthalet (PET) polytetrafluoroethylene (PTFE) and three different types of protective DynemaSB21, DynemaSB5 and DynemaSB71 textiles made of Ultra High Molecular Weight Polyethylene (UHMWPE). The effect of treatment time and applied power on the surface properties are investigated by contact angle measurement & scanning electron microscopy (SEM) analysis. Contact angles with water and glycerol were used to determine the surface free energy of the sample. The results indicated that few seconds of exposure time was sufficient to make significant improvement in hydrophilicity of the sample. SEM images indicated that the surface roughness significantly increases after the treatment need to add your postal address.

References

[1] D. Hegemann H. Brunner and C. Oehr. Plasma treatment of polymer to generate stable hydrophobic surfaces. Plasmas and Polymers, 16:1469–85, 2002.
[2] S. Y. Moon W. Choe and B. K. Kang. A uniform glow discharge plasma source at atmospheric pressure. Appl. Phys. Lett., 84(2):188, 2003.
[3] E. E. Kunhardt. Generation of large volume, atmospheric pressure non equilibrium plasmas. IEEE Trans. Plasma Sci., 28:189–200, 2007.
[4] R. B. Tyata, D. P. Subedi, R. Shrestha. C. S. Wong, Generation of uniform atmospheric pressure argon glow plasma by dielectric barrier discharge, PRAMANA Journal of Physics, 80(3):507-17, 2013.