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Surface Modification of Soda-Lime Glass by Low-Pressure Glow Plasma and Gliding Arc Plasma Treatments

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Surface preparation is the key step to better adhering multi substrates for electronics, photonics, architecture and packaging without facing with a poor performance. Soda-Lime Glass, being cheap and amorphous, is a very suitable substrate for preparing films. Since the process of printing on glass is so intolerable and because of the existing difficulties in activating its surface, we are trying to improve the procedure of dyeability and its adhesion properties by using plasma treatment on the surface of the glass samples. In this research, the surface of soda-lime glass was studied by the application of Low-Pressure Glow Plasma and Gliding Arc Plasma so that the key properties of glass such as water contact angle, roughness and dyeability could be tested.

In this study, Two basic parameters including Treatment Time and Power for both Low-Pressure Glow Plasma and Gliding Arc Plasma were taken into consideration. To study the improvement of the surface structure of soda-lime glass samples, Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), Fourier Transform Infrared spectroscopy (FTIR) and Water Contact Angle (WCA) were performed.

The test of WCA shows that the angle of contact with the surface of the soda-lime glass, after plasma treatment, extremely decreased and the surface energy of the glass considerably increased in every test. Also, SEM and AFM show that plasma treatment has had remarkable impacts on the surface structure of the substrate in such a way that the increase in both the adhesion of the surface of the glass and its roughness is sensible. Tests of washing and rubbing show that in optimum case, the paint printed has acceptable stability. At last, the results obtained from both devices are compared to each other for industrial applications.

Keywords
Surface Modification
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