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**A comparison study of improvement of binding strength of polypyrrole (PPy) coating on polyester using Argon, Oxygen and Nitrogen plasma treatment** TARIQ MEHMOOD, JANE DAI, ABBAS KOUZANI, AKIF KAYNAK, Deakin University — In this work, we have studied the performance of different plasma gases (Ar, $N_2$, and $O_2$) and the factors responsible for the improvement of binding of PPy with both polyester thin film and fabric. The plasma was generated by a radio frequency (RF) generator. The gas pressure ($8\times10^{-2}$mbar) and the RF power (100 W) were kept the same, while treatment time varied between 60 and 180 sec. Treated samples were subsequently coated with PPy. The oxygen plasma treated samples showed much more pronounced changes in the surface topography compared to nitrogen and argon plasma treated samples. The contact angle decreased from 84 $^\circ$ for the untreated sample to 55 $^\circ$ for Argon, 42 $^\circ$ for nitrogen and 35 $^\circ$ for oxygen plasma-treated samples after 120 sec treatment. Abrasion resistance and conductivity measurements suggest effectiveness of different plasma gases in the following order: $O_2$ >Ar>$N_2$. XPS results show a decrease in C-C (284.6 eV) and an increase in C-O (286.4 eV) and O-C=O (288.7 eV) percentages for each plasma gas, while oxygen to carbon ratios for oxygen, argon and nitrogen plasma are 0.56, 0.5 and 0.46 respectively. It is concluded that improvement of binding of PPy is both due to increased surface roughness and incorporation of oxygen containing functional groups.

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