

## Nanostructural Analysis of the Polylactic Acid (PLA) Fibers Functionalized by RF Plasma Treatment

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**Abstract :** These the aliphatic polyesters such as Polylactic Acid (PLA) in the form of fibers, nanofibers or plastic films, generally possess chemically inert surfaces, free porosity, and surface free energy ( $\Delta G$ ) lesser than 32 mN/m. It is therefore considered a low surface energy material, consequently has a low work of adhesion. For this reason, the products manufactured using these polymers are often subjected to surface treatments in order to change its physic-chemical surface, improving their wettability and the Work of Adhesion (WA). Plasma Radio Frequency low pressure (RF) treatment was performed in order to improve the Work of Adhesion (WA) on PLA fibers. Different parameters, such as, power, ratio of working gas (Argon/Oxygen) and treatment time were used to optimize the plasma conditions to modify the PLA surface properties. With plasma treatment, a significant increase in the work of adhesion on PLA fiber surface was observed. The analysis performed by XPS showed an increase in polar functional groups and the SEM and AFM image revealed a considerable increase in roughness.

**Keywords :** RF plasma, surface modification, PLA fabric, atomic force macroscopic, Nanotechnology

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