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Poly(acrylic) nanocoatings deposited by AP-PECVD processes on paper substrates for packaging applicationsLlorenç Bautista¹, Jordi Mota¹, Laia Crespo¹, José Manuel García¹, Meritxell Martínez¹, Laurent Aubouy¹¹LEITAT TECHNOLOGICAL CENTER, Terrassa, Spain

lbautista@leitat.org

Surface modification of paper substrates is industrially carried out by ozone or plasma pre-treatments before deposition of polymeric laminates (i.e. polyethylene) or printing inks for packaging applications. These surface pre-treatments can suffer ageing due to different aspects (interaction with ambient air, recombination of free radicals generated onto surface, reorientation of polymeric chains, etc.). As a consequence, a lack of adhesion is observed and the requirements requested for this application are not accomplished. Acrylic micrometric coatings on paper are an interesting alternative to ozone or Atmospheric Pressure Plasma (APP) pre-treatments to confer permanent wettability and adhesion properties. These coatings are currently deposited onto paper substrates by roll-to-roll conventional coating systems. However, the coatings obtained are relatively expensive and generate wastewaters. Our purpose in the present work is to study the deposition of poly(acrylic) nanocoatings by Atmospheric Pressure Plasma Enhanced Chemical Vapour Deposition (AP-PECVD) processes onto paper substrates for packaging applications. The objective is to achieve permanent wetting and adhesion properties onto paper substrates by this continuous, cheap and environmentally friendly processes.

We have carried out AP-PECVD processes onto paper substrates (50 g/m²) by using acrylic acid (AA) as polymeric precursor. We have analyzed He/AA ratio, speed of treatment and power of discharge. Temperature and distance between electrodes have been maintained constant at 150°C and 1.2 mm, respectively. Wettability and adhesion properties have been evaluated by dynamic contact angle and surface tension measurements. Surface chemistry have been analyzed by XPS. The changes of the topography have also been observed using SEM.

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