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**EFFECT OF THE TYPE OF GAS AND TEMPERATURE DURING ATMOSPHERIC PRESSURE GLOW DISCHARGE TREATMENTS ON LDPE FILMS**

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A lot of research and development effort on plasma technology applied to polymeric films has been done since the early 1980s for different applications. However, some aspects hamper its effective scaling-up for industrialization. Some of these obstacles are intrinsically connected to the technology itself (i.e. usual effects of ageing, superficial properties conferred), some other are connected to the development of the technology (i.e. low-pressure and atmospheric pressure plasma systems, capability and throughput of the processes), or to the nature of polymeric structures (i.e. flow of plasma fluids on polymeric substrates, plasma-surface interactions). However, there exist today an important need of still more research effort. In this context, a lack of studies regarding the effect of the temperature during atmospheric pressure plasma (APP) treatments has been observed. Our purpose in the present study is to analyze in deep the effect of the temperature of different atmospheric pressure plasmas on the surface modifications produced on low density polyethylene (LDPE) films used mainly for the food packaging industry.

An atmospheric pressure glow discharge system as been used to treat the surface of hydrophobic LDPE films in continuous mode. The effect of the temperature of plasmas of air, oxygen, helium and their blends between 20°C and 60°C has been analyzed. Static or dynamic contact angle measurements have been carried out depending on the hydrophilic character of the plasma-treated samples. Surface chemical analysis using FTIR-ATR and XPS techniques have been done. The changes of the topography have also been observed using SEM.

**Keywords**

atmospheric pressure plasma  
glow discharge  
temperature  
surface modification  
LDPE film