

Accepted Manuscript

Effect of corona treatment on adhesion enhancement of LLDPE

Anton Popelka, Igor Novák, Mariam Ali S.A. Al-Maadeed,
Mabrouk Ouederni, Igor Krupa



PII: S0257-8972(17)31235-5
DOI: doi:[10.1016/j.surfcoat.2017.12.018](https://doi.org/10.1016/j.surfcoat.2017.12.018)
Reference: SCT 22936
To appear in: *Surface & Coatings Technology*
Received date: 1 October 2017
Revised date: 30 November 2017
Accepted date: 8 December 2017

Please cite this article as: Anton Popelka, Igor Novák, Mariam Ali S.A. Al-Maadeed, Mabrouk Ouederni, Igor Krupa , Effect of corona treatment on adhesion enhancement of LLDPE. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2017), doi:[10.1016/j.surfcoat.2017.12.018](https://doi.org/10.1016/j.surfcoat.2017.12.018)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Effect of corona treatment on adhesion enhancement of LLDPE

Anton Popelka^{1,*}, Igor Novák², Mariam Ali S A Al-Maadeed^{1,3}, Mabrouk Ouederni⁴, Igor Krupa⁵

¹Center for Advanced Materials, Qatar University, P.O. Box 2713, Doha, Qatar

²Polymer Institute, Slovak Academy of Sciences, Dúbravská cesta 9, 845 41 Bratislava 45, Slovakia

³Materials Science and Technology Program, Qatar University, P.O. Box 2713, Doha, Qatar

⁴QAPCO R&D – Qatar Petrochemical Company, P.O. Box 756, Doha – State of Qatar

⁵QAPCO Polymer Chair Professor, Center for Advanced Materials, Qatar University, P.O. Box 2713

Abstract

Polymers/metal laminates are often used to improve physical and mechanical properties, especially those required in building applications. A flat aluminum composite panel (ACP) consisted mainly of two thin metal sheets usually made of aluminum (Al) and a non-metal core, such as polyethylene (PE). The lack of adhesion associated with the low wettability of PE is a serious problem. An eco-friendly, dry, non-destructive corona treatment technique can be applied to solve this problem. In this work, the use of a corona treatment to enhance the adhesion properties of linear low-density polyethylene (LLDPE) was studied. The changes in surface and adhesion properties were thoroughly analyzed using various analytical techniques and methods to obtain the optimal parameters for corona discharge using contact angle measurements, Fourier transform infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM) and atomic force microscopy (AFM). AFM force adhesion measurements were used to analyze the effect of the corona treatment on the adhesion enhancement of LLDPE, and the peel tests confirmed a significant increase in peel resistance in the LLDPE/Al laminate. A synergy effect from using the corona treatment in combination with an ethylene acrylic acid dispersion primer was observed.

Keywords: Corona Treatment, Wettability, Adhesion, Polyethylene, Laminates

* Corresponding author: A. Popelka, anton.popelka@qu.edu.qa

Download English Version:

<https://daneshyari.com/en/article/8024378>

Download Persian Version:

<https://daneshyari.com/article/8024378>

[Daneshyari.com](https://daneshyari.com)