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CORONA DISCHARGE TREATMENT OF POLYPROPYLENE POWDER

M. Rahmat, H. Rahimi^{*}, S. M. Mirabedini

Iran Polymer and Petrochemical Institute, P.O. Box 14965/115, Tehran, Iran

**Corresponding author: H.Rahimi@ippi.ac.ir*

Polypropylene (PP) has excellent mechanical and chemical properties. It is inexpensive and can be easily recycled thus making it attractive for many engineering applications. However it has poor adhesion and printability characteristics due to its nonpolar nature. For this reason various surface modification techniques have been developed to generate polar groups on surface of PP. Corona discharge treatment (CDT) is among these and it is widely used for modification of polymeric films. Most of the studies on CDT of surfaces are about modification of polymeric films, and there are very few studies regarding modification of polymeric powder. In this study, a PP powder was surface modified through exposure to CDT, and then the bulk and adhesion properties of samples were analyzed. Yellow index of the samples was measured and it was observed that modified samples were yellower than the virgin PP. A qualitative test method was devised to characterize wettability of polypropylene powder. This technique clearly distinguished the difference between untreated and corona treated polypropylene powder. FTIR-ATR test method was employed to identify functional groups. Results showed that after modification of PP powder by CDT, the carbonyl and hydroxyl groups' concentration had increased. The crystallinity of treated PP samples was investigated by differential scanning calorimetry (DSC) and X-Ray analysis. The results showed the formation of ? crystal structure after melting of modified powder.