

Surface modification of polymers by an atmospheric pressure plasma generated in a pin to plane electrode configuration

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A small size, order of a few mm's, plasma was generated in a pin to plane electrode configuration. Two kinds of plane electrode, aluminum and Indium Tin Oxide glass, were used in order to compare the characteristics of conventional corona or corona-dielectric barrier hybrid discharge. The hybrid discharge was chosen for the feasibility study of plasma surface modification as it was proven from electrical and optical diagnostics that the hybrid discharge was more electrically stable and had lower rotational temperature than the corona discharge. In ambient air, using helium gas, all polymer samples, such as polyethylene and polypropylene, became more hydrophilic, and their surface properties were changed only within the radius of less than about 12 mm. In addition, several effects of gas temperature and treatment time on the surface modification were studied besides the durability, and it seemed as though there was an optimum condition for a good and lasting plasma surface modification.