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Polystyrene surface modification with atmospheric pressure capillary dielectric barrier micro-plasma jet

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Non-thermal atmospheric pressure micro-plasma jets are rapidly gaining importance as they are technologically simple, environmentally friendly and are very economical as they often do not require expensive vacuum equipment. These sources have numerous applications such as deposition, surface modification and, particularly in biomedicine, sterilization and wound treatment. Among the applications this study is focused on the surface modification of polystyrene. The plasma solution is a micro-plasma jet based on capillary dielectric barrier (DBD) discharge. The micro-capillary was used with an internal diameter of 200 mm and with an outer diameter of 330 mm. The surface modification is spatially investigated by water contact angle measurement of which it available to make an extremely small size water drop, Pico-liter scale, for the high spatial resolution. We confirm the contact angles are changed from around 80 degrees for untreated surface to around 40 degrees for treated one. The treated area is around 10 times larger than the micro capillary tube as few millimeters in diameter. It shows also distance dependence of from the end of plasma jet, called plasma plume. We will discuss with more results and also fundamental mechanisms of our micro-plasma jet.

Keywords
Atmospheric pressure
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