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In-line surface cleaning using atmospheric pressure plasma

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The low pressure plasma has been commonly used to remove the surface contamination. However, in spite of the effectiveness of low pressure plasma cleaning, the associated vacuum system makes it difficult to be applied for in-line cleaning process. Recently, the atmospheric pressure plasma is under extensive research due to its applicability for in-line process.

In this study, the atmospheric pressure plasma has been generated using DBDD(double barrier dielectric discharge) method and a gas flow was used to extract the plasma from the discharge volume in order to apply for the glass sample in motion underneath. The Ar or N₂ plasma were found to be very effective for surface cleaning. The gas flow rate was about 15 LPM and the high voltage inverter power of 60 W has been used. The speed of glass sample was varied from 10 cm/min to 50 cm/min. After in-line plasma cleaning, the water contact angle of the glass sample was drastically reduced down to 7 °compared to the un-treated 50 °. The detailed experimental set-up for the atmospheric pressure plasma generation and the results will be shown and the usefulness of the atmospheric pressure plasma will be discussed.