

# Non-thermal atmospheric pressure plasma jet and its application for polymer treatment

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## I. INTRODUCTION

Non-thermal atmospheric pressure plasma jet is a suitable source for polymer treatment. The main characteristic of this plasma jet is the remote operation and its scalable dimension, thus, allowing local treatment of 3D surfaces [1]. In this work an atmospheric pressure DBD plasma jet has been constructed and the application of the plasma jet for polymer treatment is investigated.

## II. PLASMA TREATMENT OF POLYMERS

PP (Polypropylene) and PTFE (Polytetrafluoroethylene) films have been treated by DBD plasma jet. As can be seen from Fig 1. the water contact angle of plasma treated pp film decreased from  $92^\circ$  to  $57.8^\circ$  for argon/water plasma treatment(500 ppm water). Surface wettability has been improved due to introduction of oxygen-containing functional groups.

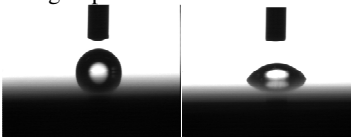


Figure 1. plasma surface treatment of polypropylene (a: untreated, b: plasma treated)

Water contact angle of the plasma modified PTFE was measured as low as  $88^\circ$ . Fig. 2. shows the XPS survey spectrum of the PTFE sample before and after 40 s plasma treatment in Ar/CO<sub>2</sub> mixture. As can be seen, the

untreated surface contains mainly C1s and F1s peaks while in the plasma-treated PTFE the O1s peak is appeared as well as peaks due to carbon and fluorine, which indicates that oxygen containing groups, were introduced by the plasma treatment.

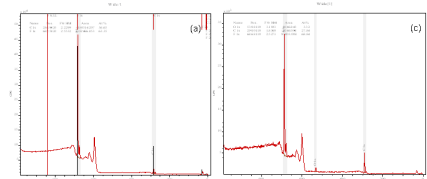


Figure 2. The XPS survey spectra of (a) untreated, and (b) plasma treated PTFE.

## III. CONCLUSION

Modification of the PP and PTFE films surface with the atmospheric pressure DBD plasma jet is studied. It is demonstrated that the non-thermal plasmas generated by DBD plasma jet is an effective way to enhance the surface properties of the PP and PTFE films.

## ACKNOWLEDGEMENTS

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## REFERENCES

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