

## **Correlation between plasma physicochemical characteristics and treated surface chemistry**

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This presentation shows examples on how plasma energetic and spectroscopic characteristics can be used to predict the surface chemistry of either plasma modified or coated surfaces. On one hand, optical emission spectroscopy in the infrared spectral region was performed in a N<sub>2</sub> and N<sub>2</sub>/H<sub>2</sub> microwave plasma discharge. Despite the fact that several key information is available in the infrared, emission spectroscopy in this spectral region has rarely been investigated. The data recorded from emission spectroscopy were used to determine the temperature of the N<sub>2</sub> microwave discharge as a function of gas pressure and microwave power by comparing the experimental and numerically generated spectra. They were also used to perform actinometry measurements that allowed determining atomic nitrogen and hydrogen densities. These plasma characteristics were thereafter correlated with the chemistry of surface-treated PTFE using multivariate analyses. On the other hand, a similar strategy was put forward to predict the properties of plasma-deposited diamond-like coatings. Thanks to these correlations, it is now possible to predetermine the surface physicochemical properties of either plasma-functionalized or plasma-coated materials from the spectroscopic characteristics of the plasma.