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Study of atmospheric pressure radiofrequency Ar/O_2 plasma afterglow used for PTFE surface modification CORINNE DULUARD, THIERRY DUFOUR, EMILE CARBONE, FRANÇOIS RENIERS, Université Libre de Bruxelles, Faculté des Sciences, Chimie Analytique et Chimie des Interfaces — Polytetrafluoroethylene (PTFE) is a hydrophobic polymer, the surface energy of which can be tailored by plasma treatment to increase its adhesion properties or to enhance its hydrophobicity, for example for biocompatible applications. Superhydrophobic behavior was obtained by low pressure O_2 plasma treatment, and was attributed to surface roughening due to strong etching by O_2 plasma. Recently, an increase in hydrophobicity has also been observed after treatment in the afterglow of an atmospheric pressure radiofrequency Ar/O_2 plasma with up to 0.1% O_2 in the feed gas. To get a better understanding of the mechanisms responsible for PTFE surface modification, the Ar/O_2 plasma afterglow is characterized by spatially resolved optical emission spectroscopy and mass spectrometry. The influence of gas flow rate, power and substrate-to-electrode distance on the plasma properties is evaluated, and correlated with the change of PTFE surface energy and surface composition, determined by water contact angle measurements and X-ray photoelectron spectroscopy respectively.

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