As already observed [1], plasma technology can be used for modifying surface characteristics and oxygen barrier property of polylactide (PLA).

In this work PLA samples have been exposed to the plasma region generated by two different plasma sources operated at atmospheric pressure: a floating electrode dielectric barrier discharge and a novel linear corona discharge. Both plasma sources have been supplied with a high voltage generator capable of producing pulses with a rise rate in the order of some kV/ns, in order to obtain diffuse plasma and avoid the formation of streamers that could cause local damage to the membrane; air and argon have been used as working gases.

Pure oxygen permeation tests in PLA films were carried out by means of a closed-volume manometric apparatus working at 35°C, already described in previous publications [2]. A pressure difference of about 1-1.2 bar has been maintained on the two sides of the membrane, and, in order to ensure the reliability of the permeability data, all the measurements were replicated at least twice (the resulting RSD is order 1%). Tests were performed shortly after the plasma treatment and also replicated at different times in order to investigate the durability of the effects obtained.

The effects of voltage, frequency and duration of exposure to plasma on the membrane surface characteristics and barrier property have been studied. The effect on membrane characteristics of the use of different plasma sources has been investigated. Results for the PLA $O_2$ permeability are presented for the different conditions analysed. Moreover, durability of the properties modification induced by each type of plasma treatment will be reported.