

Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Acquisition of Cell-Adhesion Ability on the Surface of Crosslinked Albumin Films Irradiated with Atmospheric-Pressure Plasma Jets MAMI IWAMURA, KOTA NAKAJIMA, RYOSUKE TAGA, KENJI TANAKA, TATSURU SHIRAFUJI, AKIRA TACHIBANA, TOSHIZUMI TANABE, Osaka City University — We have applied an atmospheric-pressure plasma jet (APPJ) using He gas to surface treatment on crosslinked albumin films. The crosslinked albumin films, to which L929 cells do not attach, acquire the L929 cell-adhesion ability by the APPJ irradiation in a quite short time of 300 s. The processing speed by the APPJ is 40-fold faster than a conventional ultraviolet light irradiation process. Furthermore, the elongated spindle-like morphology of the cells indicates strong adhesion between the cells and the film. We have confirmed the formation of hydrophilic chemical bonds such as COH and COOH through X-ray photoelectron spectroscopy (XPS) on the APPJ-irradiated crosslinked albumin films. An increase in the cell-adhesion ability with increasing the APPJ irradiation time has a positive correlation with the increase in O (1s) peak intensity in the XPS spectra of the films. However, the optical emission spectrum of the APPJ does not show strong emission of O (777 nm) and OH (309 nm). These results suggest that the causes of the hydrophilic chemical bonds are the dangling bond formation by abundant excited N₂ and He, and successive oxidation of the dangling bonds by ambient air and/or water vapor.

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Date submitted: 15 Jun 2015

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