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A new method for the alignment of electrospun nanofibers by oxygen plasma treatment NATSUMI KOBAYASHI, NORIHISA MIKI, KOICHI HISHIDA, ATSUSHI HOTTA, Keio Univ. — An effective way of controlling the alignment of electrospun nanofibers using oxygen plasma treatment was introduced. Poly (dimethylsiloxane) (PDMS) was selected as a base material for electrospinning and polyvinyl alcohol (PVA) was chosen as an electrospun-nanofiber material. It was found that most of PVA nanofibers were selectively deposited on the O2 plasma-treated area of PDMS, while only a few PVA nanofibers were randomly deposited on the untreated area of the PDMS film. Interestingly, a number of PVA nanofibers were neatly aligned along the border of the untreated area and the O2 plasma-treated area of PDMS. The surface structures and the morphology of the PDMS films with PVA nanofibers were analyzed by scanning electron microscopy, water contact angle measurements, and X-ray photon spectroscopy. By selecting the optimized ratio of treated and untreated area of PDMS film, it was found that more than 80% of PVA nanofibers could be deposited parallel to the border of the treated and untreated area of PDMS. We used PVA as a reference material for the nanofiber alignment in this study, but similar deposition behavior was also observed for polyurethane (PU) fibers.

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