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Hydrophilic Treatment of Inner Surface of Polymer Tubes using Tubular Low-Pressure Plasma SEIGO TAKASHIMA, MICHIKO ITO, SABURO UCHIDA, TAKESHI AOKI, MICHİYUKI KUME, Plasma Center for Industrial Applications, Nagoya Urban Industries Promotion Corporation — Polymer tubes are widely used for the flow channel parts of gas and fluid. The inner surfaces of the tubes are necessary to have functional modification such as purity, hydrophilic property, hydrophobic property, and thin film deposition. In order to realize the inner surface modification of the long polymer tube having the inner diameter of a few millimeters, a tubular low-pressure plasma system consisted of a dielectric tube with two tubular metal electrodes was constructed. The dielectric tube is the processing object. The dielectric material was the nylon (polyamide) tube with an inner diameter of 4 mm and an outer diameter of 6 mm. The tube was surrounded with two copper electrodes with a length of 25 mm. The distance between two electrodes was 13 mm. RF power at 13.56 MHz was applied to the electrode. The other electrode was grounded. We demonstrated the hydrophilic treatment of the inner surface of the tubes employing the system with Ar gas. At a pressure of 100 Pa, an RF power of 40 W, and a discharge time of 5 s, the contact angle of water drop on the inner surface of the tube decreased from 80° to 0°.

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