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Surface energy modification for biomedical material by corona streamer plasma processing to mitigate bacterial adhesion IBRAHIM ALHAMARNEH, Al-Balqa' Applied University, PATRICK PEDROW, Washington State University — Bacterial adhesion initiates biofouling of biomedical material but the processes can be reduced by adjusting the material's surface energy. The surface of surgical-grade 316L stainless steel (316L SS) had its hydrophilic property enhanced by processing in a corona streamer plasma reactor using atmospheric pressure Ar mixed with O_2. Reactor excitation was 60 Hz ac high-voltage ($\leq$ 10 kV RMS) applied to a multi-needle-to-grounded-torus electrode configuration. Applied voltage and streamer current pulses were monitored with a broadband sensor system. When Ar/O_2 plasma was used, the surface energy was enhanced more than with Ar plasma alone. Composition of the surface before and after plasma treatment was characterized by XPS. As the hydrophilicity of the treated surface increased so did percent of oxygen on the surface thus we concluded that reduction in contact angle was mainly due to new oxygen-containing functionalities. FTIR was used to identify oxygen containing groups on the surface. The aging effect that accompanies surface free energy adjustments was also observed.

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