ROUGHNESS OF POLY(ε-CAPROLACTONE) FILMS AFTER THE LOW-TEMPERATURE PLASMA TREATMENT

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Poly(ε-caprolactone) is a biodegradable aliphatic polyester which exhibits very good bioacceptance, high blend miscibility and drug permeability. Despite the advantages of this polymer, there are a number of disadvantages such as hydrophobicity and low surface energy. One solution to this problem may be the use of low-temperature atmospheric pressure plasma. The purpose of this work is to study the roughness parameters of poly(ε-caprolactone) films after the low-temperature plasma treatment.

Initial film samples of poly(ε-caprolactone) were obtained from a 1 % solution of poly(ε-caprolactone) with a molecular weight of Mw = 80,000 g/mol (Sigma-Aldrich, England). The each side of material was treated with low-temperature atmospheric pressure plasma (the treatment time was 30 s). The study of the surface relief of films and TM was carried out using an atomic force microscope «Solver-HV» (NT-MDT, Russia). Surface roughness profiles were generated in the Gwyddion 2.49 and Origin 9.0 software with an accuracy of 1 nm. Roughness parameters were processed in accordance with ISO 4287:1997. For the calculation, at least 10 surface profiles were used for each group of samples. The following parameters were set: *Ra, Rq, Rt, Rsk, Rv, Rp, Rtm, Rvm, Rp*.

The initial films had *Ra* parameter of 50.9±3.6 nm, *Rq* of 67.8±4.4 nm, *Rt* of 594.2±59 nm, *Rv* of 381.9±96 nm, *Rtm* of 421.2±16.2 nm, *Rvm* of 262.4±34.4 nm, *Rpm* of 158.8±19.6 nm.

The plasma decreased the roughness parameters of poly(ε-caprolactone) films: *Ra* in 1.8 times, *Rq, Rt, Rpm* in 1.4 times, *Rv, Rvm, Rtm* in 2 times. The plasma didn't change Rsk and Rp parametrs of the of poly(ε-caprolactone) films.