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Surface morphology of low-temperature argon-plasma-treated *Bombyx mori* silk fibroin fiber

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Abstract

The effects of argon-plasma treatment on the morphological and topographical surface structures of a *Bombyx mori* silk fibroin (SF) fiber were studied by using atomic force microscopy (AFM) and lateral modulation friction force microscopy (LM-FFM). Surface changes were analyzed in image and in quantity for different plasma treatment times. The AFM and LM-FFM analyses showed that the roughness of the fiber surface increased after plasma treatment because of plasma bombardment and etching. A longer treatment time, resulting in a rougher surface, progressively changed the fiber surface, thereby leading to the formation of a new surface. These results revealed that low-temperature argon-plasma treatment is an effective method to improve the performance of SF fibers.

Keywords

silk fiber, argon-plasma treatment, surface modifications, atomic force microscopy (AFM), lateral modulation friction force microscopy (LM-FFM)

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