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**Abstract:** The evolution of the topography of titanium surfaces treated with femtosecond laser radiation in stationary conditions as a function of radiation fluence and number of laser pulses is investigated. Depending on the processing parameters, ripples, microcolumns, wavy or smooth surfaces can be obtained. The ripples predominate for fluences near the damage threshold of titanium (0.2+/-0.1) J/cm(2), while microcolumns form during the first 200 pulses for fluences between (0.6+/-0.2) and (1.7+/-0.2) J/cm(2). A wavy topography develops for fluences and number of pulses higher than (1.7+/-0.2) J/cm(2) and 300, respectively. A bimodal surface topography consisting of surface ripples overlapping a microcolumnar topography can be obtained if the surfaces are firstly treated to create microcolumns followed by laser treatment with a lower fluence near the ablation threshold of the material, in order to generate periodic ripples.

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