

## Thermally Induced Self-Assembly and Cyclization of I - Leucyl- I -Leucine in Solid State

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### Abstract

© 2017 American Chemical Society. Thermal treatment of oligopeptides is one of the methods for synthesis of organic nanostructures. However, heating may lead not only to self-assembly of the initial molecules, but also to chemical reactions resulting in the formation of new unexpected nanostructures or change in the properties of the existing ones. In the present work, the reaction of cyclization of dipeptide I-leucyl-I-leucine in solid state under heating was studied. The change in morphology of dipeptide thin film and formation of nanostructures after heating was visualized using atomic force microscopy. This method also was used for demonstration of differences in self-assembly of linear and cyclic dipeptides. The chemical structure of reaction product was characterized by NMR spectrometry, FTIR spectroscopy and GC-MS analysis. Kinetic parameters of cyclization were estimated within the approaches of the nonisothermal kinetics ("model-free" kinetics and linear regression methods for detection of topochemical equation). The results of present work are useful for explanation the changes in the properties of nanostructures based on short-chain oligopeptides, notably leucyl-leucine, after thermal treatment, as well as for the synthesis of cyclic oligopeptides.

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