

AFM study of thin films of oligopeptide L-valyl-L-valine before and after interaction with vapors

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Abstract

© 2016, Pleiades Publishing, Ltd. The effect of the substrate type, ambient relative humidity, water vapor and vapors of organic compounds on the surface morphology of films based on dipeptide L-valyl-L-valine are studied using atomic force microscopy. It is found that at a low relative humidity the dipeptide is crystallized on a hydrophobic substrate with the formation of pyramidal structures, while at a high relative humidity hollow truncated cones are observed. A dipeptide film coated with irregularly shaped objects is observed on hydrophilic substrates. After saturation of the L-valyl-L-valine film with the vapors of proton-donor solvents the formation of new objects on its surface or the destruction of initial objects can occur, while water vapor does not affect the surface morphology. For proton acceptors the major factor affecting the surface morphology of dipeptide film is their energy of the hydrogen bond with proton donors. It is shown that the effect of organic vapors on the film morphology depends on the substrate type.

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Keywords

atomic-force microscopy, film morphology, oligopeptide L-valyl-L-valine, processing in vapors of organic compounds