

Thermal stability, sorption properties and morphology of films of dipeptide and tripeptide based on L-glycine

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Abstract

The effect of the number of amino acid residues in L-glycyl-L-glycine and L-glycyl-L-glycyl-L-glycine on thermal stability of powders, the sorption properties and surface morphology of thin films has been found. Dipeptide forms the film coated with disk-shaped nano-objects on the hydrophilic substrate, while tripeptide self-organizes to the film coated with nano-crystals on the hydrophobic substrate. Replacement of substrates (hydrophilic→hydrophobic) leads to the formation of smooth films of studied oligopeptides. Powders of oligopeptides do not form stable clathrates with water and organic compounds at room temperature. But their thin films are capable to bind organic or water vapors with high thermodynamic activity. Surprising difference in sorption selectivity of dipeptide and tripeptide has been observed. L-glycyl-L-glycine predominantly binds organic H-donors, while L-glycyl-L-glycyl-L-glycine is more selective to H-acceptors.

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Keywords

Morphology of film, Nanostructures, Oligopeptides, Sorption, Thermal stability