

Analysis of hydration of ovalbumin by isothermal calorimetry

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Abstract

© 2014 by Nova Science Publishers, Inc. All rights reserved. Isothermal calorimetry was applied to characterize the hydration dependencies of the excess thermodynamic functions of binary proteinwater systems. Here, in particular, the excess partial enthalpies of water and hen egg-white ovalbumin have been determined. The excess partial enthalpies for ovalbumin are compared with the published data for several unrelated globular proteins (ribonuclease A, lysozyme, chymotrypsinogen A, serum albumin, lactoglobulin). These biomacromolecules represent a series of proteins in which the hydrophobicity of proteins is gradually changed over a wide range. It was found that the excess partial quantities for the studied proteins are determined by the hydration of the hydrophilic and hydrophobic protein groups. The more hydrophilic a protein, the more significant a hydrophilic hydration contribution is and vice versa. Ribonuclease A is the most hydrophilic protein in the present study. This protein has the most significant hydrophilic hydration contribution. Lactoglobulin is the most hydrophobic protein under the study. This protein has the most significant hydrophobic hydration contribution. Ovalbumin shows intermediate properties.

Keywords

Biocalorimetry, Enthalpy, Excess functions, Protein (biomacromolecule) hydration