

466.

标题: Water Dynamics at Protein Interfaces: Ultrafast Optical Kerr Effect Study

作者: Mazur, K (Mazur, Kamila); Heisler, IA (Heisler, Ismael A.); Meech, SR (Meech, Stephen R.)

来源出版物: JOURNAL OF PHYSICAL CHEMISTRY A 卷: 116 期: 11 页: 2678-2685

DOI: 10.1021/jp2074539 出版年: MAR 22 2012

在 Web of Science 中的被引频次: 2

被引频次合计: 2

引用的参考文献数: 72

摘要: The behavior of water molecules surrounding a protein can have an important bearing on its structure and function. Consequently, a great deal of attention has been focused on changes in the relaxation dynamics of water when it is located at the protein surface. Here we use the ultrafast optical Kerr effect to study the H-bond structure and dynamics of aqueous solutions of proteins. Measurements are made for three proteins as a function of concentration. We find that the water dynamics in the first solvation layer of the proteins are slowed by up to a factor of 8 in comparison to those in bulk water. The most marked slowdown was observed for the most hydrophilic protein studied, bovine serum albumin, whereas the most hydrophobic protein, trypsin, had a slightly smaller effect. The terahertz Raman spectra of these protein solutions resemble those of pure water up to 5 wt % of protein, above which a new feature appears at similar to 80 cm⁻¹, which is assigned to a bending of the protein amide chain.

入藏号: WOS:000301766500011

语种: English

文献类型: Article

KeyWords Plus: FREQUENCY RAMAN-SPECTROSCOPY; EFFECT OHD-OKE; LIQUID WATER; AQUEOUS-SOLUTIONS; HYDRATION DYNAMICS; FEMTOSECOND DYNAMICS; MOLECULAR-DYNAMICS; SOLVATION DYNAMICS; GLOBULAR-PROTEINS; MODEL PEPTIDES

地址: [Mazur, Kamila; Heisler, Ismael A.; Meech, Stephen R.] Univ E Anglia, Sch Chem, Norwich NR4 7TJ, Norfolk, England

通讯作者地址: Meech, SR (通讯作者), Univ E Anglia, Sch Chem, Norwich NR4 7TJ, Norfolk, England

出版商: AMER CHEMICAL SOC

出版商地址: 1155 16TH ST, NW, WASHINGTON, DC 20036 USA

Web of Science 分类: Chemistry, Physical; Physics, Atomic, Molecular & Chemical

学科类别: Chemistry; Physics

IDS 号: 912AT

ISSN: 1089-5639

29 字符的来源出版物名称缩写: J PHYS CHEM A

ISO 来源出版物缩写: J. Phys. Chem. A

来源出版物页码计数: 8