

798

标题: Long-range hydration state of lipid bilayer studied by THz spectroscopy

作者: Hishida, M (Hishida, Mafumi); Tanaka, K (Tanaka, Koichiro)

编者: Jansen ED; Thomas RJ

来源出版物: OPTICAL INTERACTIONS WITH TISSUE AND CELLS XXIII??丛书:

Proceedings of SPIE??卷: 8221??文献号: 82210T??DOI: 10.1117/12.907655??出版年: 2012??

在 Web of Science 中的被引频次: 0

被引频次合计: 0

引用的参考文献数: 23

摘要: Although the importance of water for bio-materials have been believed, even the amount of hydration water have not been defined. Despite picosecond time scale of the collective dynamics of bulk water, past studies for the hydration state of solute with using NMR or neutron scattering have measured water dynamics only in nanosecond time scale and have defined only the strongly perturbed water as the hydration water. However, it is expected that much more slightly perturbed water exist near the solute surfaces. To define precisely the hydration state of lipid bilayer, which is the basic structure of biomembrane, including slightly perturbed water, we have used terahertz time-domain spectroscopy, with which picosecond dynamics of water can be measured. By comparing the terahertz results with the structural information of the lipid/water system obtained by X-ray scattering, it is concluded that there is a long-range hydration layer on the surface of lipid membrane on up to 4-5 water layers (1 nm) [1], which is 5 time as much as that in the previous reports by NMR or neutron scattering. Our results indicates that the hydration water is important for the self-assembly of biomolecules because its length scale is comparable to that of some interactions such as van der Waals interaction.

入藏号: WOS:000302290100014

语种: English

文献类型: Proceedings Paper

会议名称: Conference on Optical Interactions with Tissue and Cells XXIII

会议日期: JAN 23-25, 2012

会议地点: San Francisco, CA

会议赞助商 : SPIE

作者关键词: Terahertz time-domain spectroscopy; Hydration state; Lipid membrane; small angle X-ray scattering

KeyWords Plus: TOTAL-REFLECTION SPECTROSCOPY; MOLECULAR-DYNAMICS SIMULATION; TERAHERTZ SPECTROSCOPY; WATER; RELAXATION; SCATTERING

地址: [Hishida, Mafumi] Univ Tsukuba, Div Chem, Fac Pure & Appl Sci, Tsukuba, Ibaraki 3058577, Japan

通讯作者地址: Hishida, M (通讯作者),Univ Tsukuba, Div Chem, Fac Pure & Appl Sci, 1-1-1 Tenno Dai, Tsukuba, Ibaraki 3058577, Japan

电子邮件地址: kochan@icems.kyoto-u.ac.jp

出版商: SPIE-INT SOC OPTICAL ENGINEERING

出版商地址: 1000 20TH ST, PO BOX 10, BELLINGHAM, WA 98227-0010 USA

Web of Science 分类: Optics

学科类别: Optics

IDS 号: BZO86

ISSN: 0277-786X

ISBN: 978-0-8194-8864-0

29 字符的来源出版物名称缩写: PROC SPIE

来源出版物页码计数: 8