

Plenary Talk

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THz Spectroscopy: A Novel Experimental Tool to Study Water Network Dynamics — ●MARTINA HAVENITH — Physikalische Chemie II, Ruhr-Universität Bochum, NC7/74, 44780 Bochum

In recent years a new frequency window has been opened: The THz range. We could demonstrate that THz absorption spectroscopy is a new tool to study waternetwork motions [1]. Thus THz absorption spectroscopy probes sensitively the fast (sub-psec) solvation dynamics around solutes. Accompanying ab initio MD simulation unravel the underlying molecular motions: In contrast to the mid infrared regime -where the absorption peaks can be assigned to intramolecular

motions- in the frequency regime below 1000 cm⁻¹ intermolecular motions with concerted particle motions dictate the spectrum [2]. Precise measurements of absorption coefficients of solvated solutes in the THz regime allow now a detailed view on the role of the water for biological function [3].

[1] S. Ebbinghaus, S.J. Kim, M. Heyden, X. Yu, U. Heugen, M. Gruebele, D.M. Leitner, M. Havenith, PNAS USA, 104, 20749 (2006).

[2] M. Heyden, J. Sun, S. Funkner, G. Mathias, H. Forbert, M. Havenith, D. Marx, PNAS 107, 12068 (2010).

[3] M. Grossmann, B. Niehues, M. Heyden, D. Tworowski, G.B. Fields, I. Sagi, M. Havenith (2010), Nature Structural & Molecular Biology, 18(10), 1102 (2011).