Structure and Orientation of Hydrophobins At the Air-Water Interface

Konrad Meister[1*], Arja Paananen[2] & Huib J. Bakker[1]

[1]*FOM-Institute for Atomic and Molecular Physics AMOLF, Science Park 104, 1098XG Amsterdam, The Netherlands*
[2]*VTT Technical Research Centre of Finland, Tietotie, Fi-02150 Espoo, Finland*

**K.Meister@amolf.nl*

Hydrophobins represent a group of surface active proteins that are highly relevant from both a biological and technological standpoint. Determining the accurate structure and orientation of hydrophobin, adsorbed to their relevant place of action, the air-water interface, holds the key for understanding the functionality of this system and will accelerate the development of related biomaterials and technologies. Here we study the structure and orientation of the class II hydrophobin (HFBII) from Trichoderma ressi using highly surface specific conventional, chiral and phase-sensitive vibrational sum-frequency generation spectroscopy. We find that HFBII readily accumulates at the air-water interface and remains in a rigid, antiparallel β-sheet containing β-barrel structure. Our data prove an interfacial conformation in which HFBII's hydrophobic patch is slightly tilted and embedded into the interface.

Acknowledgements This work is part of the research program of the "Stichting voor Fundamenteel Onderzoek der Materie (FOM)", which is financially supported by the "Nederlandse organisatie voor Wetenschappelijk Onderzoek (NWO)". K.M. gratefully acknowledges the European Commision for funding through the award of a Marie Curie fellowship.