Preface

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Editorial: Molecules in Prison

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Narrow confinements with large interface areas can have drastic effects on the physico-chemical properties of molecular ensembles. Accordingly, they play major roles in nature and technology. This special issue collects results obtained in the Research Unit FOR 1583 *Wasserstoffbrückenbildende Flüssigkeiten bei Anwesenheit innerer Grenzflächen unterschiedlicher Hydroaffinität* (Hydrogen-Bonded Liquids Subject to Interfaces of Various Hydroaffinities) funded by the Deutsche Forschungsgemeinschaft (German Research Foundation) DFG. In this research unit a number of groups from the Technische Universität Darmstadt, the GSI Helmholtzzentrum für Schwerionenforschung, the Technische Universität Dortmund, and the Martin-Luther-Universität Halle-Wittenberg were devoted towards the experimental investigation and theoretical modeling of confinement effects ranging from hard confinements in mesoporous silica or polycarbonate membranes over functionalized pores to soft confinements in micelles. The preparation of the confinements included ion-track etching, sol-gel chemistry preparation, post-synthetic grafting of peptides or ALD deposition of oxides as well as micelle formation of surfactants and microemulsions. The confined molecules ranged from simple liquids over binary mixtures of water and alcohol or water and a surfactant to complex solutions of proteins, which mimic the crowding effects in biological cells. As broad as the investigated systems were also the experimental techniques employed for their characterization. Structures of the confinement and the interface were revealed by solid-state NMR and DNP enhanced solid-state NMR, SAXS and TEM. Mobility effects were investigated by NMR relaxometry and diffusometry, dielectric spectroscopy, and triplet solvation dynamics. Peptide and protein structures were analyzed by NMR and FTIR spectroscopies. All these experi-

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mental studies were complemented by computational approaches, including molecular-dynamics and *abinitio* methods.

The 15 articles [1–15] collected in this special issue are closely related to these topics and in most cases serve as final progress reports of the different subprojects or as final overview and report of the whole 6 years of FOR 1583. They constitute both original papers and review papers. For a current list of all publications from FOR 1583 and related information see Home Page FOR1583.

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Gerd Buntkowsky and Michael Vogel
Guest Editors

References

1. G. Buntkowsky, M. Vogel, R. Winter, Z. Phys. Chem. **232** (2018) 937.
2. D. Sebastiani, Z. Phys. Chem. **232** (2018) 973.
3. T. Watermann, D. Sebastiani, Z. Phys. Chem. **232** (2018) 989.
4. M. Brodrecht, E. Klotz, C. Lederle, H. Breitzke, B. Stühn, M. Vogel, G. Buntkowsky, Z. Phys. Chem. **232** (2018) 1003.
5. P. Weigl, V. Talluto, T. Walther, T. Blochowicz, Z. Phys. Chem. **232** (2018) 1017.
6. M. Weigler, M. Brodrecht, H. Breitzke, F. Dietrich, M. Sattig, G. Buntkowsky, M. Vogel, Z. Phys. Chem. **232** (2018) 1041.
7. D. Demuth, M. Sattig, E. Steinrücken, M. Weigler, M. Vogel, Z. Phys. Chem. **232** (2018) 1059.
8. B. Kuttich, A. Matt, A. Weber, A.-K. Grefe, L. Vietze, B. Stühn, Z. Phys. Chem. **232** (2018) 1089.
9. J.-M. Knop, R. Winter, Z. Phys. Chem. **232** (2018) 1111.
10. M. Brodrecht, B. Kumari, H. Breitzke, T. Gutmann, G. Buntkowsky, Z. Phys. Chem. **232** (2018) 1127.
11. P. Ruff, M. Carrillo-Solano, N. Ulrich, A. Hadley, P. Kluth, M. E. Toimil-Molares, C. Trautmann, C. Hess, Z. Phys. Chem. **232** (2018) 1147.
12. B. Kumari, D. John, P. Hoffmann, A. Spende, M. E. Toimil-Molares, C. Trautmann, C. Hess, P. Ruff, R. Stark, M. Schulze, G. Buntkowsky, A. Andrieu-Brunsen, T. Gutmann, Z. Phys. Chem. **232** (2018) 1173.
13. J. Geske, M. Harrach, L. Heckmann, R. Horstmann, F. Klameth, N. Müller, E. Pafong, T. Wohlfromm, B. Drossel, M. Vogel, Z. Phys. Chem. **232** (2018) 1187.
14. P. Ruff, C.Dietz, R. Stark, C. Hess, Z. Phys. Chem. **232** (2018) 1227.
15. S. Weißheit, M. Kahse, K. Kämpf, A. Tietze, M. Vogel, R. Winter, C. M. Thiele, Z. Phys. Chem. **232** (2018) 1239.