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Preface: Special Topic on Supramolecular Self-Assembly at Surfaces

Ludwig Bartels
University of California - Riverside

Karl-Heinz Ernst
Swiss Federal Laboratories for Materials Science and Technology

Hong-Jun Gao
Chinese Academy of Sciences

Patricia A. Thiel
The Ames Laboratory (U.S. Department of Energy) and Iowa State University, thiel@ameslab.gov

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Abstract
Supramolecular self-assembly at surfaces is one of the most exciting and active fields in Surface Science today. Applications can take advantage of two key properties: (i) versatile pattern formation over a broad length scale and (ii) tunability of electronic structure and transport properties, as well as frontier orbital alignment. It provides a new frontier for Chemical Physics as it uniquely combines the versatility of Organic Synthesis and the Physics of Interfaces. The Journal of Chemical Physics is pleased to publish this Special Topic Issue, showcasing recent advances and new directions.

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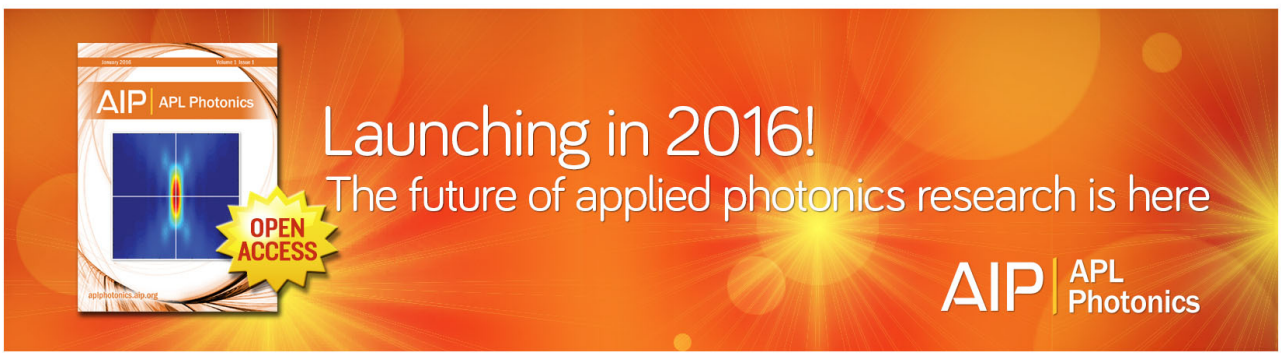

Preface: Special Topic on Supramolecular Self-Assembly at Surfaces

Ludwig Bartels,[1] Karl-Heinz Ernst,[2] Hong-Jun Gao,[3] and Patricia A. Thiel[4]
[1]*Department of Chemistry and the Materials Science and Engineering Program, University of California - Riverside, Riverside, California 92521, USA*
[2]*EMPA, Swiss Federal Laboratories for Materials Science and Technology, Überlandstrasse 129, CH-8600 Dubendorf, Switzerland*
[3]*Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, People's Republic of China*
[4]*Department of Chemistry, Department of Materials Science and Engineering, Ames Laboratory, Iowa State University, Ames, Iowa 50011, USA*

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Supramolecular self-assembly at surfaces is one of the most exciting and active fields in Surface Science today. Applications can take advantage of two key properties: (i) versatile pattern formation over a broad length scale and (ii) tunability of electronic structure and transport properties, as well as frontier orbital alignment. It provides a new frontier for Chemical Physics as it uniquely combines the versatility of Organic Synthesis and the Physics of Interfaces. *The Journal of Chemical Physics* is pleased to publish this Special Topic Issue, showcasing recent advances and new directions. © *2015 AIP Publishing LLC.* [http://dx.doi.org/10.1063/1.4914017]

Supramolecular self-assembly at surfaces is one of the most exciting and active fields in Surface Science today. *The Journal of Chemical Physics* is pleased to publish this Special Topic Issue, showcasing recent advances and new directions.

Classic surface science has dealt with small molecules such as CO and O_2; it has focused on elucidating their physical and chemical interactions with a supporting substrate. Over the past decade or two, the choice of species employed has widened substantially to include organic molecules with multiple functionalities and complex backbones. Now, their lateral interaction becomes just as important as their binding to the substrate. This gives rise to the field of Supramolecular Surface Chemistry. Here, hydrogen bonds, coordination of metal centers, substrate-mediated attraction/repulsion, and van der Waals interaction play a decisive role. The final surface self-assembly is, thus, a product of the interplay between classic substrate registry and direct lateral interaction. And, the set of resultant patterns can be as diverse as the interactions at hand and the molecular building blocks available. Common substrates for such studies are coinage metals (gold, silver, copper) and graphite, with 2-dimensional materials such as graphene and boron nitride gaining importance.

Applications of surface-stabilized supramolecular assemblies can take advantage of two key properties: (i) versatile pattern formation over a broad length scale and (ii) tunability of electronic structure and transport properties, as well as frontier orbital alignment. The first makes them excellent platforms for two-dimensional molecular-recognition and host-guest chemistry in high-specificity sensors, heterogeneous catalysts, etc. The second is crucial for organic-inorganic hybrid interfaces in photovoltaics, light emitting diodes, and other organic semiconductor applications.

Supramolecular self-assembly at surfaces provides a new frontier for Chemical Physics as it uniquely combines the versatility of Organic Synthesis and the Physics of Interfaces. This Special Topic Issue covers our current understanding of the ensuing phenomena.

