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Editorial

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Preface to the *Chemistry of Materials* Special Issue on π-Functional Materials

While the history of synthetic π-conjugated organic systems dates back to the eighteenth century, their use was largely based on their ability to serve as dyes and pigments. However, since the development of organic photoconductors for the xerography industry in the 1960s and the realization by Heeger, Shirakawa, and MacDiarmid that conjugated polymers can be turned into electrically conducting materials (that is, "synthetic metals") in the 1970s, the field has witnessed a flurry of activities that have turned conjugated materials into active elements enabling a wide range of electronic, opto-electronic, and photonic technologies with extensive applications. An additional characteristic of π-conjugated compounds is the possibility of combining electrical and optical activity with the mechanical properties typical of plastics in a single material. These characteristics have opened the way to flexible devices based on organic thin films. A testament to the impressive development of the field and to the innovations it spurred is that organic electronics is projected to become a US$ 30B industry by 2015.

The versatility of the chemistry available for the synthesis of conjugated molecules, oligomers, polymers, or dendrimers, coupled with theoretical modeling, provides opportunities for the design of compounds with well-defined, tunable electronic and optical properties. Yet, the translation of the properties of the individual molecular level building blocks into the desired bulk materials properties remains a challenge that is far from being met. As a consequence, significant developments in the materials chemistry of these systems from both experimental and theoretical points of view are required to realize the full potential of this important class of materials.

It is the goal of this Special Issue to provide a broad overview of the state-of-the-art in the field of π-Functional Materials. The contributions cover the chemistry of materials with specific electronic, optical, nonlinear optical, magneto-optical, and/or photophysical properties that can be exploited in a wealth of applications as diverse as organic field-effect transistors, light-emitting diodes, solid-state lighting, sensing, photovoltaics, electro-optics, or photorefractivity.

The call for papers for the Special Issue has been received with great enthusiasm by the community as the list of accepted contributions amounts to some fifty manuscripts including over twenty-five Short Reviews and over twenty regular Articles and Communications. The Short Reviews were selected to provide a broad overview of the chemistry of π-Functional Materials and of the current status of their applications. We believe this Special Issue will provide an excellent reference on π-Functional Materials for years to come.

Finally, our warmest thanks go to Monique Bredas who coordinated the handling of the manuscripts for the Special Issue and to all our referees who delivered their reviews in spite of the strict deadlines often imposed on them.

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Special Issue Editors

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