Young Career Focus: Dr. Birgit Esser (Rheinische Friedrich-Wilhelms-Universität Bonn, Germany)

Background and Purpose. From time to time ***SYNFORM*** meets young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This ***SYNSTORY*** with a Young Career Focus presents Dr. Birgit Esser (Rheinische Friedrich-Wilhelms-Universität Bonn, Germany).

BIOGRAPHICAL SKETCH

Dr. B. Esser

Birgit Esser was born and raised in Heidelberg, Germany. She obtained her Diploma degree in chemistry at the Ruprecht-Karls-Universität Heidelberg (Germany) in 2004, and her PhD in 2008 working with Professor Rolf Gleiter. Her research focused on the synthesis and quantum chemical investigation of cyclacenes. In 2009, she joined the group of Professor Timothy Swager at the Massachusetts Institute of Technology in Cambridge, MA (USA) as a postdoctoral fellow, where she developed detection methods for ethylene gas using conjugated polymer- and carbon nanotube-based sensors. Since April 2012 she has been an independent research group leader at the Rheinische Friedrich-Wilhelms-Universität Bonn (Germany). Her research interests involve the development of functional organic materials for batteries and optoelectronic devices. She has received a number of awards and fellowships throughout her career including research group funding through the Emmy Noether program of the German Research Foundation.

INTERVIEW

SYNFORM | *What is the focus of your current research activity?*

Dr. B. Esser | My research focuses on the development of functional organic materials for applications in organic batteries and optoelectronic devices. Specifically, I am interested in the synthesis of organic materials as electrode-active ingredients in batteries and in the synthesis and investigation of novel types of conjugated polymers and cyclic conjugated molecules. All of these research areas involve molecular design aided by computational chemistry and multi-step organic synthesis, as well as a variety of experimental techniques for investigating the properties of the materials.

SYNFORM | *When did you get interested in synthesis?*

Dr. B. Esser | I became interested in synthesis when I took my first organic laboratory course. I was fascinated by the combination of mechanistic theory and experiment and the possibility to create new compounds. My interest was deepened during internships in different research groups, where the compounds I synthesized had relevance to research projects. Up to now I find it incredibly rewarding to obtain a target compound for the first time.

SYNFORM | *What do you think about the modern role and prospects of organic synthesis?*

Dr. B. Esser | Research in the past decades has provided organic chemists with advances in synthetic methodology as well as accurate theoretical models to predict molecular properties. I believe that it is a unique opportunity and the responsibility of organic chemists to use these tools to design and synthesize molecules and materials with tailored properties for applications that meet societal needs.

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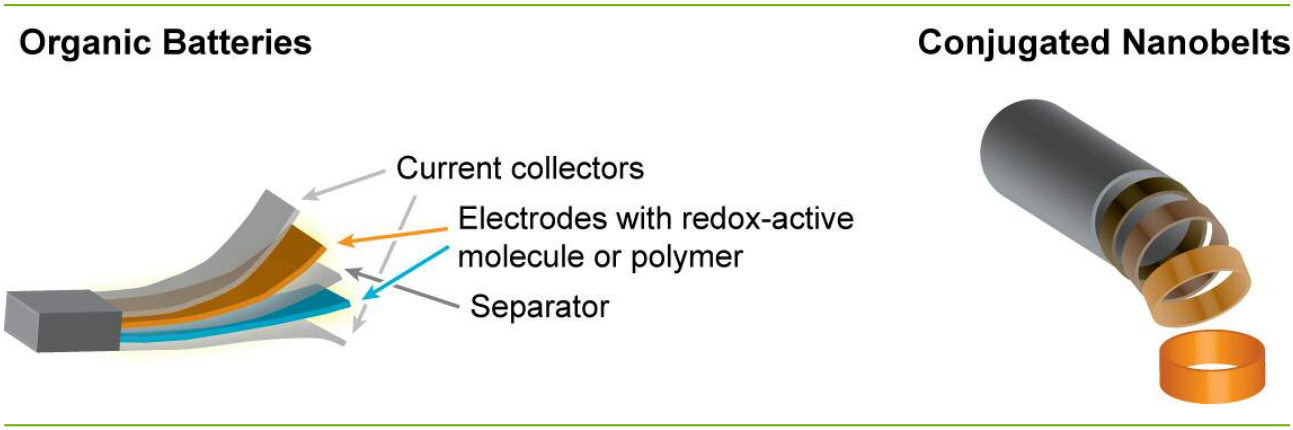

Figure 1

SYNFORM | *Your research group is active at the frontier of functional organic materials design. Could you tell us more about your research and its aims?*

Dr. B. Esser | One of the main goals of my research is to design organic electrode materials for batteries. Current technology employs inorganic materials, often containing heavy metals; therefore, we aim to provide more sustainable, less toxic and environmentally friendly alternatives through the synthesis of organic materials for electrodes. Specifically, my group designs and synthesizes redox-active molecules and polymers, which are then incorporated into battery electrodes as the active materials. Another main goal of my research is the development of cyclic conjugated molecules, so-called nanobelts. These molecules are intriguing materials due to their structural and electronic properties and can serve as model systems and templates for novel types of carbon nanotubes. By means of computational chemistry we have identified structures with interesting properties and are currently developing synthetic strategies towards these nanobelts. Additionally, my group designs and synthesizes conjugated oligomers and polymers with novel types of subunits. These materials have potential to be employed in optoelectronic devices.

SYNFORM | *What is your most important scientific achievement to date and why?*

Dr. B. Esser | As a young researcher I would like to think that my most important scientific achievements lie ahead of me. Our current research activities have recently provided us with (unpublished) results that appear very promising. I believe that my group expects some exciting results in the future.

Matteo Zanda

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