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Tetrathiafulvalene-fused radiaannulenes and π-extended tetrathiafulvalenes -towards new electrochromic materials

Radiaannulenes (RAs) are cyclic molecules with both exo and endocyclic double bonds and are hence structurally between radialenes and annulenes. Due to their quinoid-like structure, they are potentially Wurster-type redox systems, which gain aromaticity upon reduction. We have combined one radiaannulene with the Weitz-type redox system tetrathiafulvalene (TTF), which gains aromaticity upon oxidation as 1,3-dithiolium rings are formed. TTF-functionalized radiaanulenes were prepared from tetraethynylethene and TTF-diiodide derivatives using Pd-catalyzed coupling reactions. Electrochemical investigations showed both reversible oxidations and reductions (in sequential one-electron steps), and the optical properties of the oxidized and reduced species were investigated by spectroelectrochemistry. The distinct optical properties of each redox state of these molecules make then interesting in the development of electrochromic materials. The synthesis and optical properties of various π-extended TTFs, which can exist in different redox states, will also be presented, including molecules with an indenoPSMorene core.

Biography

Mogens Brøndsted Nielsen is Professor of Organic Chemistry in Department of Chemistry at the University of Copenhagen, where he teaches courses in advanced organic chemistry, heterocyclic chemistry, and supramolecular chemistry. He has published more than 100 peer-reviewed papers, monographs, and book chapters.

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