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ENERGYPOLIS SEMINAR

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Synthesis of Functionalized Azobenzene Toward Photochromic Solar Cells

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The increasing energy demand of the world calls for other energy sources than fossil fuels, like solar energy. Silicon-based solar cells are already commercialised however, in an attempt to provide cheaper materials, organic solar cells are being investigated. This work presents the synthesis of a photochromic material to be used for building-integrated photovoltaics. The material is designed to be colored and photoactive when sufficiently illuminated, but to become transparent and inactive in the dark. It is composed of three parts: a polythiophene core, an azobenzene switch and a flexible linker. The thiophene rings are linked alternatively to the azobenzene switch or the linker, which are connected together. Two synthesis routes are proposed. The first and most studied is about grafting a flexible precursor of the azobenzene switch on the polythiophene. The second route consists in grafting the rigid azo-switch on the polythiophene. Both routes are investigated to see if a rigid azobenzene moiety is a problem in future reactions where all three components are connected together. The very first reaction steps of this project were investigated. The difficulties encountered during the synthesis are addressed, and some mechanisms are shown to provide hypothetic explanations. Finally eventual solutions based on literature research are suggested to highlight the potential improvements on the synthetic strategy.

CV: Luca Cervini
Born in 1991 Meyrin (GE), Switzerland, Luca Cervini studied chemistry in the University of Geneva where he graduated with a Msc in Chemistry in 2014. During his Master, he worked as a research and teaching assistant for the lab work of first year students. He also visited EPFL as exchange student for two courses about polymers, as well as an internship of one month. He then stayed further at EPFL to accomplish his Master Thesis.