

Solar energy conversion – How it all begins

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Solar energy is the most abundant renewable energy source available. Conversion of light into electricity and chemical energy are the two major paths for solar energy conversion. Nanostructured organic materials are being explored for applications in photovoltaic solar energy conversion, as well as photocatalysis for solar fuel generation. Light harvesting, energy transport, charge photogeneration and recombination, charge transport are the elementary processes accounting for the conversion of light energy into useful charge carriers. We show how a combination of time resolved spectroscopy covering the time scales from femtoseconds to milliseconds and spectral range from the X-rays to the far infrared (THz frequencies) is a powerful tool to study the light induced processes and provide mechanistic information valuable for design of novel or optimized materials.