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Light Irradiation as Key to Shape and Function of Nano-Assemblies in Solution FRANZISKA GROEHN, University Erlangen- Nuremberg — Developing strategies to exploit solar energy become more and more important. Inspired by natural systems it is highly promising to self-assemble functional species into effective tailored supramolecular units. Here we report self-assembled polymer structures in solution, taking advantage of optical properties of hybrid structures and light responsiveness. A new type of photocatalytically active self-assembled polymer structure in aqueous solution consists of supramolecular nano-objects obtained from macroions and multivalent inorganic “counterions” such as nanoparticles or clusters. These can exhibit expressed selectivity or even allow catalytic reactions in solution that are not possible with the building blocks only. Further, polyelectrolyte-porphyrin nanoscale assemblies exhibit tunable optical properties including strong fluorescence and an up to 20-fold higher photocatalytic activity than without polymeric template. A different approach is to transfer light energy into mechanical energy. Here, light energy is converted into nanoscale shape changes. This route for the conversion of light is highly promising for applications in drug delivery, nanosensors and solar energy conversion.

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