

Abstract Submitted
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Photoinduced Reduction of Noble Metal Ions to Metal Nanoparticles on Tubular J-Aggregates D.M. EISELE, A. BURMISTROVA, Humboldt-Universitaet zu Berlin, H. V. BERLEPSCH, C. BOETTCHER, Freie Universitaet Berlin, S. KIRSTEIN, Humboldt-Universitaet zu Berlin — Cyanine dye molecules are well known to serve as sensitizers for photo induced electron transfer processes. Technically, this feature is utilized in photographic films to form elementary silver specks in solid silver halide crystallites. In this contribution it is shown that the photo-induced electron transfer reaction from cyanine dyes to noble metal ions can be utilized to grow metallic nanoparticles at the surface of tubular J-aggregates in solution. The J-aggregates are formed by amphiphilic cyanine dye molecules upon aggregation in aqueous solution. The particles are grown by addition of noble metal salts (Na_2PdCl_4 or AgNO_3) to the cyanine dye aggregate solution and by illumination with visible light. The particles are observed by Cryogenic transmission electron microscopy (cryo-TEM) and are rather uniform in size with a mean diameter of a few nanometres. In case of Pd salt the aggregates are destroyed upon particle formation, while in case of Ag salt the aggregates are unaffected by the formation of silver particles. In parallel to the growth of the particles a dramatic quenching of the aggregate fluorescence is observed. The particles form spontaneously and the number and size of the particles depends on the molar Ag/dye ratio. A systematic study of this photo induced process for AgNO_3 will be presented.

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