

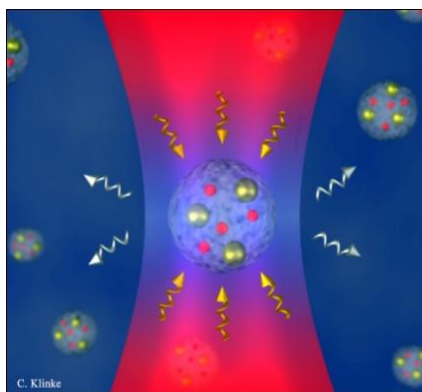
Synthesis and optical trapping of colloidal quantum dot-based structures

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Colloidal quantum dots (QDs) have an increasing role in bio-imaging and other diagnostic techniques due to their unique optical properties. In this talk the synthesis of several nanostructures combining QDs, metallic nanoparticles, and thermoresponsive organic or inorganic platforms will be presented.^{1,2} These platforms can be manipulated in an optical trap, where plasmon-exciton interactions and photoinduced effects including light-assisted activation and bleaching are observed and characterized.^{3,4} These studies emphasize the importance of surface chemistry in QDs. These systems combine the ability for thermal sensing and labeling, representing very interesting platforms for the design of thermal sensors in biological studies.



Sketch of a polymer bead decorated with colloidal quantum dots and gold nanoparticles trapped by optical tweezers.

- 1) A. Salcher, M. Nikolic, S. Casado, M. Velez, H. Weller and B. H. Juárez, “CdSe/CdS nanoparticles immobilized on pNIPAM-based microspheres” *Journal of Materials Chemistry*, 20, 1367–1374, (2010)
- 2) M. Acebrón et al. *ACS Appl. Mater. Interfaces*, 7, 12, 6935–6945, (2015)
- 3) S. Hormeño, N. G. Bastús, A. Pietsch, H. Weller, R. Arias-Gonzalez, B. H. Juárez, “Plasmon-Exciton interactions demonstrated by Optical Tweezers”, *Nano Letters*, 11, 4742–4747, (2011)
- 4) S. Hormeño et al. “Laser Heating Tunability by Off-Resonant Irradiation of Gold Nanoparticles” *Small*, 10, 2, 376-384, (2014)