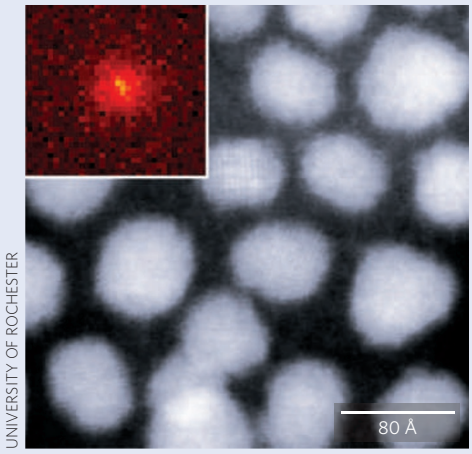
LIGHT-EMITTING NANOCRYSTALS

An end to blinking

Light-emitting semiconductor nanocrystals are potentially useful for tasks such as single-molecule biological imaging and the creation of single-photon sources and low-threshold lasers, but so far they have always had a serious drawback. When optically pumped, even by continuous-wave light, they blink. This erratic switching on and off of their photoluminescence causes problems because it not only makes them harder to image but also leads to unpredictable fluctuations in the number of photons emitted and in their emission time.

It now seems that there could be an end to such woes. Xiaoyong Wang and co-workers from the University of Rochester, Eastman Kodak, Cornell University and the Naval Research Laboratory have succeeded in fabricating composite nanocrystals that, they say, can suppress the blinking completely on timescales of many minutes (*Nature* doi:10.1038/nature08072). Their nanocrystals consist of an alloyed core of CdZnSe surrounded by a shell of ZnSe.



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When pumped with green (532-nm) light the nanocrystals emit red (~620-nm) light which is steady and stable in intensity.

For many years scientists have been trying to discover what causes the blinking and to prevent it. Although a complete picture is still not clear, the general consensus is that the blinking is caused by the presence of extra electrical charges in a nanocrystal. This greatly increases its non-radiative (Auger) decay rate, thus allowing an excited nanocrystal to shed its excess energy in ways other than emitting light.

In contrast, it seems that the formulation of the nanocrystals produced by Wang *et al*. leads them to emit light through a transition involving a trion (a charged exciton) for which competing non-radiative Auger decay process are greatly weakened.

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