Colloidal quantum dot field-effect transistors

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Propositions

Belonging to the PhD thesis

Colloidal Quantum Dot Field-Effect Transistors

From Electronic Circuits to Light Emission and Detection

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1. By choosing appropriate ligands, capping individual PbS QDs, it is possible to control the doping and charge transport properties of the semiconducting film.
2. PbS QDs solids often show trapping-free electron transport, while holes are trapped severely by deep-level states.
3. Since the charge transport in PbS QDs is governed by phonon-assistant hopping, at low temperature the luminescence efficiency increases to the same extent that charge carrier mobility decreases.
4. QDs can be used as complementary n-type material for carbon nanotubes in highly-integrated electronic circuits, because of their orthogonal processing.
5. Patterning by lithography does not compromise optoelectronic properties of PbS QDs, which are restored after thermal annealing.
6. One of the most promising industrial applications of quantum dots is where large area photosensitive films are needed, such as for X-ray imaging.
7. PbS colloidal QDs are synthesized from earth-abundant and globally produced precursors, and the cost of them will be reduced further by the advancements in synthesis methods.
8. Anyone who has never made a mistake has never tried anything new. (Albert Einstein)