Charge transport and trap states in lead sulfide quantum dot field-effect transistors

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Stellingen

Behorende bij het proefschrift

Charge Transport and Trap States in Lead Sulfide Quantum Dot Field-Effect Transistors

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1. Carrier traps in the active layers and on the gate insulator surfaces determine the characteristics and the performance of FET devices. (Chapter 1)
2. SAMs introduce dipoles on the SiO_2 surface, which allow upward or downward bending of the energy levels of semiconductors. (Chapter 2)
3. Low density of trap states with Cytop gating is the microscopic origin of the improved mobility in the devices. (Chapter 3)
4. The increase of the dielectric constant of gate insulators results in the increase and the broadening of the trap density of states. (Chapter 4)
5. The proper choice of ligands combined with the use of BV dopant results in n-type doping and more stable PbS QD FETs. (Chapter 5)
6. The change of mobility in strained devices is attributed to the decrease/increase of the inter-QD distance due to the bending of the capping ligands. (Chapter 6)
7. Collaborative research is like electronic coupling in QD devices: the stronger the coupling, the better the performance.
8. A PhD student should be like a PbS QD film. He should show remarkable behavior under pressure.
9. The measure of greatness of a scientific idea is the extent to which it stimulates thoughts and opens up new lines of research. (adapted from Paul Dirac)