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标题: Se-doping dependence of the transport properties in CBE-grown InAs nanowire field effect transistors
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摘要: We investigated the transport properties of lateral gate field effect transistors (FET) that have been realized by employing, as active elements, (111) B-oriented InAs nanowires grown by chemical beam epitaxy with different Se-doping concentrations. On the basis of electrical measurements, it was found that the carrier mobility increases from 10(3) to 10(4) cm(2)/(V x sec) by varying the ditertiarybutyl selenide (DtBSe) precursor line pressure from 0 to 0.4 Torr, leading to an increase of the carrier density in the transistor channel of more than two orders of magnitude. By keeping the DtBSe line pressure at 0.1 Torr, the carrier density in the nanowire channel measures a parts per thousand 5 x 10(17) cm(-3) ensuring the best peak transconductances (> 100 mS/m) together with very low resistivity values (70 Omega x mu m) and capacitances in the attofarad range. These results are particularly relevant for further optimization of the nanowire-FET terahertz detectors recently demonstrated.
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