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Dielectrophoretic Alignment of ZnO Nanowires SANTOSH MURALI, VIVIENNE NG, CHIEN-CHIH HUANG, JOHN CONLEY, JR., School of Electrical Engineering and Computer Science, Oregon State University, Corvallis, OR-97331 — Work on individually constructed devices has demonstrated that nanowires (NWs) offer great promise for applications such as sensing and optoelectronics. Despite this work, reliable large scale alignment and integration of these individual nanostructures into a lithographically defined process remains a challenge. Dielectrophoresis (DEP) is a promising alignment method in which a nonuniform electric field is used to exert force on and manipulate NWs in solution. DEP offers the possibility of rapid, large area room-temperature assembly of NWs across opposing electrodes. DEP structures were fabricated on Si substrates and consisted of pairs of parallel Al electrodes on a 600nm insulating SiO2 film. ZnO NWs were suspended in isopropyl alcohol (IPA) and flowed across the electrodes. Alignment yield was investigated as a function of electrode spacing (2 micrometer, 5 micrometer, 8 micrometer, 11 micrometer), DEP voltage, DEP frequency, IPA flow rate, and NW length. The electrical properties of the formed ZnO NW devices will also be reported.

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