Indium Gallium Zinc Oxide(IGZO) Thin-film transistor operation based on polarization effect of liquid crystals from a remote gate

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Abstract: This research presents a new field effect transistor (FET) by using liquid crystal gate dielectric with remote gate. The fabrication of thin-film transistors (TFTs) was used Indium tin oxide (ITO) for the source, drain, and gate electrodes, and indium gallium zinc oxide (IGZO) for the active semiconductor layer. 5CB liquid crystal was used for the gate dielectric material, and the remote gate and active layer were covered with the liquid crystal. The output and transfer characteristics of the LC-gated TFTs were investigated.

구형 Sn 표면의 SnO_2 나노와이어 네트워크: 합성과 NO_2 감지 특성
SnO_2 Nanowire Networks on a Spherical Sn Surface: Synthesis and NO_2 sensing properties

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Abstract: One-dimensional metal oxide nanostructures have attracted considerable research activities owing to their strong application potential as components for nanosize electronic or optoelectronic devices utilizing superior optical and electrical properties. In which, semiconducting SnO_2 material with wide-bandgap Eg = 3.6 eV at room temperature, is one of the attractive candidates for optoelectronic devices operating at room temperature [1, 2], gas sensor [3, 4], and transparent conducting electrodes [5]. The synthesis and gas sensing properties of semiconducting SnO_2 nanomaterials have become one of important research issues since the first synthesis of SnO2 nanowires. In this study, SnO_2 nanowire networks were synthesized on a basis of a two-step process. In step 1, Sn spheres (30-800 nm in diameter) embedded in SiO_2 on a Si substrate was synthesized by a chemical vapor deposition method at 700° C. In step 2, using the source of these Sn spheres, SnO_2 nanowire (20-40 nm in diameter; 1-10 μm in length) networks on a spherical Sn surface were synthesized by a thermal oxidation method at 800° C. The Au layers were pre-deposited on the surface of Sn spherical and subsequently oxidized Sn surface of Sn spherical formed SnO2 nanowires networks. Field emission scanning electron microscopy and high-resolution transmission electron microscopy images indicated that SnO_2 nanowires are single crystalline. In addition, the SnO_2 nanowire is also a tetragonal rutile, with the preferred growth directions along [100] and a lattice spacing of 0.237 nm. Subsequently, the NO_2 sensing properties of the SnO_2 network nanowires sensor at an operating temperature of 50-250° C were examined, and showed a reversible response to NO_2 at various NO_2 concentrations. Finally, details of the growth mechanism and formation of Sn spheres and SnO_2 nanowire networks are also discussed.