Hydrothermally -Grown a -plane ZnO for Hydrogen Sensing



Nonpolar a -plane (11-20) ZnO film was grown by facile, low -cost, and environment -friendly hydrothermal method, and its response to hydrogen gas was investigated using a -plane ZnO Schottky diode. Wurtzite structure ZnO with bandgap of 3.37 eV and exciton binding energy of 60 meV has attracted great interests in light emitting and sensing materials, which can be synthesized by simple aqueous solution growth. Various crystal planes of ZnO including semipolar (11-22), nonpolar a -plane (11-20) and m-plane (1-100), and c -plane Zn -polar (0001) and O -polar (000-1) have their own atomic polarity, density, configuration, and bonding state, and these properties determine the different hydrogen sensing characteristics. A -plane ZnO Schottky diode was fabricated. After annealing of Schottky electrode, the barrier height was increased, and the device showed improved rectifying behaviors. A -plane ZnO film was also analyzed by SEM, AFM, XRD, and PL.