

Real-time HCl detection using functionalized ZnO nanowire device

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Recently, a smart sensor is one of emerging issues in 4th revolution industry. Especially, semiconductor nanowire sensor has attracted considerable attention as a next-generation device for chemical and biological sensors in the sensor field. In our previous work, we developed a novel fabrication approach of ZnO nanowire field effect transistors (NW FET) based on plasma processing of etching and deposition, consisting of sequential processes of metal oxide deposition, nano-imprint lithography, low-damage plasma etching, and non-thermal plasma deposition. It was demonstrated that our approach could be mass-produced with a low cost-effective and high repeatability. As a part of effort to detect highly toxic chemical such as HCl, novel functionalization on ZnO NW FET is introduced. Finally, this novel sensing platform is evaluated in terms of selectivity and sensitivity compared with the conventional sensors. Finally, we believe that this work can lead to novel sensing paradigm toward a wide range of applications.