

### Etching Reaction of ZnO Nanowires with Atomic Hydrogen

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The reaction of atomic hydrogen on ZnO nanowires was investigated in an ultrahigh vacuum (UHV) system. Hydrothermally grown ZnO nanowires were exposed to atomic hydrogen and increasing the sample temperature, desorbed products including molecular hydrogen, water and zinc were studied by temperature-programmed desorption (TPD). While increasing the amount of hydrogen exposure, TPD spectra were saturated at high exposure above 500,000 L. Desorption peaks of molecular hydrogen were observed at 330 K, 450 K related to surface hydrogen and 553 K from bulk hydrogen. Water and zinc desorption implied the etching reaction of ZnO nanowires occurred. Due to the large surface area, the etching reaction of ZnO nanowires was dominant and could be observed by scanning electron microscopy (SEM). This work was supported by the 2011 Global Research Network Program (220-2011-1-C00033).