

Surface adsorption and bulk diffusion of hydrogen atoms on ZnO surfaces

Probir Chandra Roy, Won Hui Doh, Chang Min Kim

경북대학교 화학과

The interaction of hydrogen (H) and ZnO surfaces has been investigated using a temperature programmed desorption (TPD) technique. When the surface is exposed to atomic hydrogen below 400 K, hydrogen is adsorbed on the surface. As the hydrogen exposure increases, bulk diffusion of hydrogen takes place. The existence of surface and bulk hydrogen has been confirmed using X-ray photoelectron spectroscopy (XPS). When the ZnO(000-1) surface dosed with hydrogen is heated, surface hydrogen is desorbed at 432 K and bulk hydrogen is evolved at ~ 539 K. Diffusion of hydrogen into the ZnO bulk is an activated process, and the activation energy is estimated to be 0.19 eV. Diffusion of hydrogen on the ZnO(10-10) surface is also investigated.