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Reaction of Methanol and Methyl Iodide on ZnO(0001) and ZnO(11-20) Single Crystal Surfaces

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The adsorption and reactions of methanol and methyl iodide on ZnO(0001) and ZnO(11-20) single crystal surfaces have been investigated using the temperature programmed desorption (TPD) technique. The interaction of methanol and methyl iodide with ZnO is stronger on the polar ZnO(0001) surface than the non-polar ZnO(11-20) surface. On ZnO(0001), methanol is decomposed to produce formaldehyde and hydrogen. Two desorption features of formaldehyde and hydrogen are observed at around 500 and 580 K. The interaction of methanol and pre-adsorbed hydrogen has been also investigated. The reaction mechanism of methanol on ZnO will be proposed.