【S-16 : 젊은진공과학자상 후보】

Adsorption and decomposition of dimethylisopropylsilane on Si(111) surface

T. S. Yang, S. J. Cho, J. -H. Boo, J. -W. Lee, S. -B. Lee, Y. Kim*
Institute of Basic Science and Department of Chemistry, Sungkyunkwan University
*Thin Film Materials Laboratory, Advanced Materials Division, Korea Research Institute of Chemical Technology

The adsorption and decomposition of dimethylisopropylsilane,$(CH_3)_2CHSiH(CH_3)_2$ on Si(111) surface have been studied in the temperature range of 100 - 1300 K in ultrahigh vacuum by X-ray photoelectron spectroscopy, thermal desorption spectroscopy, and low-energy Cs ion reactive scattering.

Dimethylisopropylsilane adsorbs molecularly on the surface at 115 K and its thermal desorption spectrum shows a board peak centered at about 160 K. $(CH_3)_2CHSiH$ and $Si(CH_3)_2$ desorption occurs at 210 K and 350 K. Additionally C_3H_5 (m/z=41) desorption is observed at 600K. The results of the low-energy Cs ion reactive scattering indicate that the adsorbed dimethylisopropylsilane was found to partially decompose to adsorb at the $Si(CH_3)_2$ and $(CH_3)_2CHSiH$, $-CH_2$, at below 200 K. The former decomposes to form CH_xSi and C_2SiH_x species with increasing temperature up to about 600 K. Above 800 K the intermediate species completely decomposes to form SiC. The possible decomposition mechanism of dimethylisopropylsilane will be proposed.