

Cyclo-addition reaction of Lewis acidic molecule; AlCl_3

**Soon Jung Jung¹, Young-Sang Youn¹, Sehun Kim¹, Ki-Jeong Kim²,
Bong Soo Kim² and Hangil Lee²**

¹Department of Chemistry and School of Molecular Science, Korea Advanced Institute of Science and Technology, Daejeon, 305-701, Republic of Korea

²Beamline Research Division, Pohang Accelerator Laboratory (PAL), Pohang University of Science and Technology, Pohang, Kyungbuk, 790-784, Republic of Korea

The study on the adsorption structure of Lewis acid molecule, AlCl_3 , on the Ge(100) surface using scanning tunneling microscopy (STM), high-resolution core-level photoemission spectroscopy (HRPES) and density functional theory (DFT). The STM investigation reveals two adsorption configurations; on-top and bridge structures. The population of bridge configuration is 20 times greater than on-top structure, since the on-top structure forms a tetragon with Ge dimer, resulting in a relatively unstable structure with high strain. In both configurations, AlCl_3 molecules interact with two Ge-atoms via cyclo-addition-like adsorption mechanism. It is expected that the two adsorption configurations are formed by double-bond character of AlCl_3 .