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Structural Determination of the Low-coverage Phase of Al on Si(001) Surface J. Y. PARK, J. H. SEO, C. N. WHANG, Institute of Physics & Applied Physics, Yonsei University, Seoul, Korea, S. S. KIM, Department of Physics, Mokwon University, Taejeon, Korea, D. S. CHOI, Department of Physics, Kangwon National University, Chuncheon, Korea, K. H. CHAE, Division of Materials Science and Technology, Korea Institute of Science and Technology, Seoul, Korea — The investigation of group-III metals on Si surfaces has been one of the typical studies in surface science for many years. This system exhibits an abundance of surface structures depending on the coverage and the annealing process. Although various theoretical and experimental studies provide useful information, the growth mechanism and detailed atomic structure model for the adsorption Al on Si(001) have not yet been established and deserve further study. In this study, atomic structure of Al layer on Si(001)-(2×1) surface have been studied by coaxial impact collision ion scattering spectroscopy (CAICISS). When 0.5 ML of Al atoms are adsorbed on Si(001) at room temperature, it is found that Al ad-atoms are dimerized and Al ad-dimers oriented parrallel to the underlying Si dimers at the position of centering T3 site with a height of 1.02 $\mathring{A}$ from the first layer of Si(001). The bond length of the Al dimer is 2.67 $\mathring{A}$. With increasing Al coverage up to 1 ML, Al ad-dimers still occupied near T3 site and the next favorable site is near HH site.

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