

## Abstract

**FT-ICR STUDIES OF CHEMICAL REACTION OF SILICON CLUSTERS,** SHIGEO MARUYAMA (Eng. Res. Inst., Univ. Tokyo, Bunkyo-ku, Tokyo 113-8656), SHUHEI INOUE (Dept. Mech. Eng., Univ. Tokyo) and MASAMICHI KOHNO (Eng. Res. Inst., Univ. Tokyo).

Silicon cluster ions generated by the laser-vaporization supersonic-expansion cluster beam source is directly injected and trapped in a 6 Tesla Fourier Transform Ion Cyclotron Resonance (FT-ICR) mass spectrometer. Mass selected silicon clusters  $\text{Si}_n^+$  ( $10 \leq n \leq 20$ ) with SWIFT technique are exposed to ethylene gas at about  $10^{-5}$  Torr for a second to a minutes as shown in Fig 1. The reaction kinetics is compared with Jarrold's ion drift tube experiments with about  $10^6$  times higher pressure and  $10^6$  times shorter reaction period. The existence of isomers for most of cluster size is evident from the reaction kinetics and reaction experiments of 'selected unreactive clusters'. The annealing of isomers through the laser irradiation and the collisions with inert gas molecules is also examined.

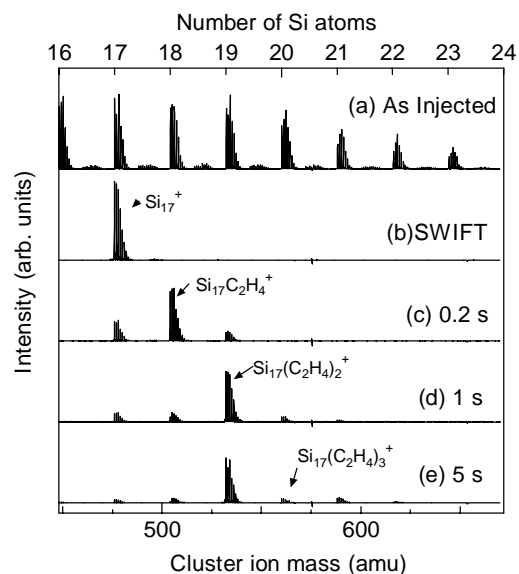


Fig. 1 Reaction of  $\text{Si}_{17}^+$  with ethylene.