Laser Annealing of Semiconductor Clusters: Trimethylamine Reactions with Positive and Negative Clusters

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ABSTRACT

Reaction studies with trimethylamine on positively charged laser-annealed silicon cluster of 39, 43, and 48 atoms magnetically levitated in a Fourier transform ion cyclotron resonance (FT-ICR) mass spectrometer reveal the same relative reaction pattern as previously observed for identical studies with ammonia and ethylene. The 39th cluster was found to be considerably less reactive than the order positive cluster size, and significantly, its negative ion is also relatively less reactively than the 43rd and 48th. The continued observation of this reactivity trend provides additional experimental evidence that the annealed clusters adopt well-organized structures, and that these crystal forms are similar for both charge states.