Ethylene Chemisorption on Levitated Silicon Cluster Ions: Evidence for the Importance of Annealing

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ABSTRACT

Mass-selected clusters were levitated in Fourier transform ion cyclotron resonance mass spectrometer (FT-ICR), and monitored during chemisorption reaction with ethylene. The reactivity of six positively charged clusters studied here varied sharply as a function of cluster size, indicating that ethylene is as sensitive a probe of the cluster-surface chemistry as reported previously for ammonia. As with ammonia, the 39th and 45th clusters were found to be particularly unreactive towards ethylene chemisorption. The results suggest that most silicon clusters in this moderately large size range are able to anneal to an energetically most favored "crystalline" form.