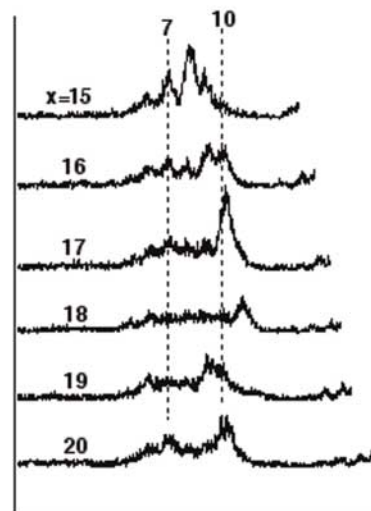


Experimental and Theoretical Approaches on the Stability of Nanoclusters

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The article introduces the readers a joint research between AIST Chubu and IMR Tohoku University on the structure and size-dependent stability of group-14 clusters by means of surface induced dissociation (SID) experiments and theoretical calculations. So far, we have investigated on tin clusters and found that the fragmentation patterns and predicted structures are similar to those of Si and Ge clusters than those of Pb clusters, which is in contrast to similarities and differences in the bulk crystal structures of these elements.



Fragment ions generated in the collision of Sn_x⁺ (x=15-20) with a graphite surface

Natural Ordering Superlattice of ZnO_{1-x}Se_x

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The ZnO_{1-x}Se_x compound semiconductor had been grown by radical source MBE for the first time and we succeeded in obtaining its large bandgap bowing parameter of 12.7eV. During this research, some SIMS depth profile of Se concentration occurred to show the formation of compositional ordering ZnO_{1-x}Se_x layers. (Fig.1a) The period of ZnO_{1-x}Se_x natural compositional ordering decreases with increasing Se concentration. The relationship between the period of the ordered layers and the Se concentration is consistent with Ferguson's theory. (Fig.1b) The dynamics of the two-dimensional nature of the compositional alternations of ZnO_{1-x}Se_x can be explained by taking the surface dynamic process of growth kinetics into consideration.

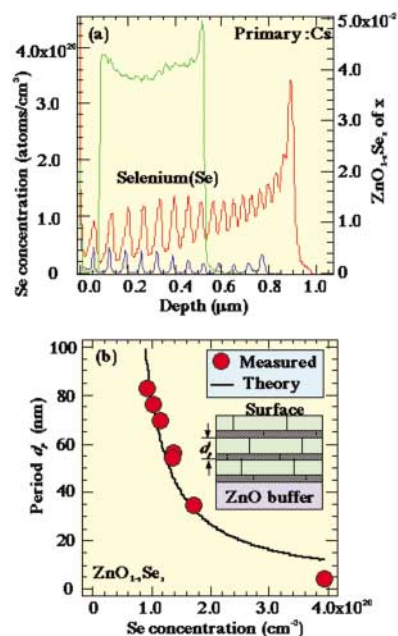


Fig.1 (a) Depth profiles of Se concentration in ZnO_{1-x}Se_x thin films measured by SIMS and (b) the dependence of the natural compositional ordered period on the Se incorporation.