2004 Vol.41 No.1 pp.101-105 DOI:

Formation Mechanism and Binding Energy for Body-Centered Cubic Structure of He_9^+ Cluster

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(Received: 2003-3-28; Revised:)

Abstract: The formation mechanism for the body-centered cubic structure of He_9^+ cluster is proposed and its total energy curve is calculated by the method of a Modified Arrangement Channel Quantum Mechanics. The energy is the function of separation R between the nuclei at the center and an apex of the body-centered cubic structure. The result of the calculation shows that the curve has a minimal energy -25.6669 (a.u.) at $R=2.550a_0$. The binding energy of He_9^+ with respect to He^++8He was calculated to be 0.8857 a.u. This means that the cluster of He_9^+ may be formed in the body-centered cubic structure of $R=2.55a_0$.

PACS: 36.40, 34.20
Key words: He_9^+ cluster, binding energy, body-centered cubic structure

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