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Formation Mechanism and Binding Energy for Icosahedral Central Structure of He^+_{13} Cluster

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Abstract: The formation mechanism for the icosahedral central structure of the He_{13}^+ 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 two nuclei at the center and an apex of the icosahedral central structure. The result of the calculation has shown that the curve has a minimal energy -37.5765 (a.u.) at $R=2.70a_0$. The binding energy of He_{13}^+ with respect to He^+ +12He was calculated to be 1.4046 a.u. This means that the cluster of He_{13}^+ may be formed in an icosahedral central structure with strong binding energy.

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Key words: He^+_{13} cluster, binding energy, icosahedral central structure

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