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The Formation Mechanism and Binding Energy for the Octahedral Central Structure of the He_7^+ Cluster

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Abstract: The formation mechanism for the octahedral central structure of the He_7^+ cluster is proposed and its total energy curve is calculated by the method of a modified arrangement channel quantum mechanics (MACQM). The energy is a function of separation R between two nuclei at the center and an apex of the octahedral central structure. The result of the calculation shows that the curve has a minimal energy -19.7296 a.u. at $R=2.40a_0$. The binding energy of He_7^+ with respect to He^++6He was calculated to be 0.6437 a.u. This means that the cluster of He_7^+ may be formed in the stable octahedral central structure with $R=2.40a_0$.

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