16o + 16o Molecular Structures Of Superdeformed States In 34s

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Drastic structure changes caused by excitation are significant characteris- tics of nuclei. Clustering and deformation are typical mechanisms of drastic structure changes.
S isotopes ($Z = 16$) are key nuclei for both of deformation and clustering. The $Z = 16$ is considered as a magic number of superdeformation, and it is expected that superdeformed (SD) bands develop in S isotopes. In a cluster structure picture, S isotopes are analogues of Be isotopes because both can form cluster structures that contain two doubly-closed-shell clusters (α and ^{16}O for Be and S isotopes, respectively) and valence neutrons. In low-lying states of Be isotopes, structures of $\alpha + \alpha +$ valence neutrons in molecular orbitals around $\alpha + \alpha$ are considered to be developed. Coexistence or mixing of SD states and $^{16}O + ^{16}O +$ valence neutrons states is expected in S isotopes. S isotopes are important to clarify deformed and cluster structures.
Structures of SD states in ^{34}S have been microscopically investigated by using the antisymmetrized molecular dynamics and the generator coordi- nate method (GCM). GCM basis are calculated by energy variation with a constraint on the quadrupole deformation parameter β. Performing GCM calculation, coexistence of positive- and negative-parity SD bands are pre- dicted. The SD bands have structures of $^{16}O + ^{16}O +$ valence neutrons. Valence neutrons in SD states are in δ^+ and/or π^- orbitals around $^{16}O + ^{16}O$. SD states in ^{34}S are analogues of low-lying states in ^{10}Be.