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The Study about Nozzle Type for Cluster Generation at Gas Cluster Ion Source

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The Korea Basic Science Institute is developing a gas cluster ion source (GCIS) for X-ray Photoelectron Spectroscopy, Secondary Ion Mass Spectroscopy, and Mass Spectroscopy. Specially, argon molecular clusters have received considerable attention to generate secondary ions from samples, such as semiconductor devices and organic light emitting diode. The study about nozzle type at argon GCIS was tried to obtain information for improved cluster formation in nozzles with different geometries. The clusters were formed when a high pressure gas expand into vacuum through a nozzle. The forecast for cluster generation in supersonic expansion was calculated using equivalent sonic nozzle diameter. In this paper, the cluster generation was compared equivalent sonic nozzle type with original nozzle type from simulation results of supersonic transfer using ANSYS. Also, some experiments were performed to verify simulation results. In this paper, we try to solve problem related on lack of the experimental data on argon cluster formation with various nozzles.