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Duoplasmatron Type Molecular Carbon Ion Source

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A duoplasmatron ion source with the carbon plasma electrode has successfully produced poly-atomic carbon ions up to C_6^+ . The intermediate electrode has six holes to guide cathode plasma to the carbon discharge anode performing as the plasma electrode. A 1 mm diameter extraction hole is opened at the center of the carbon plasma electrode, where is no exposure to the plasma from the cathode region. The ion source maintains a stable discharge with both H_2 and Ar as discharge support gas, but works better at lower pressure with Ar. A hydrogen plasma produced molecular ions of hydrocarbons while Ar plasma delivered a beam with the mass peak corresponding to Ar_2^+ with the intensity about one-eighth of Ar^+ peak. With 150 W discharge power, the source produced about 1 micro-ampere of mass separated C_6^+ ion current.

E-mail for contact person

mwada@mail.doshisha.ac.jp

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Primary authors: WADA, Motoi (Doshisha University); Mr AKI, Hajime (Doshisha University); Dr MIYAMOTO, Naoki (Doshisha University)

Presenter: WADA, Motoi (Doshisha University)

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