

MonPE33

Development of a compact ECR ion source for various ion production

Masayuki Muramatsu¹⁾, Atsushi Kitagawa¹⁾, Satoru Hojo¹⁾, Yoshiyuki Iwata¹⁾, Ken Katagiri¹⁾, Yukio Sakamoto¹⁾, Nobuaki Takahashi²⁾, Noriyuki Sasaki³⁾, Keita Fukushima³⁾, Katsuyuki Takahashi³⁾, Taku Suzuki³⁾, Toshinobu Sasano³⁾, Takashi Uchida⁴⁾, Yoshikazu Yoshida⁴⁾, Shogo Hagino⁵⁾, Takuya Nishiokada⁵⁾, Yushi Kato⁵⁾

¹⁾National Institute of Radiological Sciences, 4-9-1 Anagawa, Inage, Chiba 263-8555, Japan

²⁾Sumitomo Heavy Industries, Ltd., 19 Natsushima, Yokosuka, Kanagawa 237-8555, Japan

³⁾Accelerator Engineering Corporation, 3-8-5 Konakadai, Inage, Chiba 263-0043, Japan

⁴⁾Toyo University, 2100 Kujirai, Kawagoe, Saitama 350-0815, Japan

⁵⁾Osaka University, 2-1 Yamada-oka, Suita, Osaka 565-0871, Japan

Corresponding Author: Masayuki Muramatsu, e-mail address: m_mura@nirs.go.jp

There is a desire that a carbon-ion radiotherapy facility will produce various ion species for fundamental research. Although the present Kei2-type ion sources are dedicated for the carbon-ion production, a future ion source is expected: 1) carbon-ion production for medical use, 2) various ions with a charge-to-mass ratio of 1/3 for the existed linac injector, and 3) low cost for modification. A prototype compact electron cyclotron resonance (ECR) ion source, named Kei3, based on Kei series has been developed to correspond to produce these various ions at National Institute of Radiological Sciences (NIRS). The Kei3 has an outer diameter of 280 mm and a length of 1120 mm. The magnetic field is formed by the same permanent magnet as Kei2. The movable extraction electrode has been installed in order to optimize the beam extraction with various current densities. The gas-injection side of vacuum chamber has enough space for an oven system. We measured dependence of microwave frequency, extraction voltage, and puller position. Charge state distributions of helium, carbon, nitrogen, oxygen, and neon were also measured.