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Beam current characteristics of negative ion source on EVISS by C12A7 electride

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C12A7 electride, a low work function material, is one of the candidate materials of the plasma grid for a cesium-free negative ion source. The enhancement of the negative ion current was demonstrated using a negative ion source with an ion source plasma discharge power of tens of watts [1]. Toward the fusion and accelerator applications, the C12A7 electrode was applied to a negative ion source with kW-class discharge power on Equipment with Versatility for Ion Source Study (EVISS). Comparing the ion beam using the plasma grid made of aluminum as reference material, the beam current increased by 70 % using the C12A7 electride where the discharge power of the induced coupling plasma was 1 kW in 0.5 Pa hydrogen gas pressure, the extraction voltage was 0.7 kV, and the acceleration voltage was 9.8 kV.

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