

JOURNAL OF PLASMA AND FUSION RESEARCH

The Journal of the Japan Society of Plasma Science and Nuclear Fusion Research

Vol. 96, No. 7, July 2020

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A high-performance Cs-free negative ion source TPDsheet-U is designed for production of negative ions by volume production in a magnetized-sheet plasma (Fig-(a)). As shown in fig-(b), hydrogen plasma is produced by a modified TPD-type discharge between an LaB₆ hot cathode, the slits of the floating electrodes and the anode (2 mm thick and 40 mm wide). The negative hydrogen ion beam is extracted by a two-grid extraction system (PG and EG) located at the periphery of the sheet plasma as shown in Fig-(c). A maximum voltage of approximately 10 kV is applied between PG and EG, so that in the vicinity of the PG apertures the electric field extracts the negative ions from the periphery of the sheet plasma toward the collector. (Keito HANAI *et al.*, Plasma and Fusion Research, Vol. 15, 2401029 (2020) <http://www.jspf.or.jp/>)

Published Monthly by

The Japan Society of Plasma Science and Nuclear Fusion Research

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