

IMPROVEMENT OF INITIAL VACUUM CONDITION ALONG 2008-2010 KSTAR

CAMPAIGN BY VESSEL BAKING

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The Korea Superconducting Tokamak Advanced Research (KSTAR) device has completed its construction in the middle of 2007. The KSTAR Vacuum Pumping System (VPS) has two main parts that consist of the vacuum vessel pumping system and the cryostat pumping system [1]. After the successful self-commissioning of the VPS in August 2007, it had been well operated throughout the past two years. The KSTAR is being upgraded for its new mission to accomplish a goal to produce D-shaped plasma with a target plasma current of 500 kA and/or pulse length of 5 seconds in the KSTAR 3rd campaign.

To maintain a good initial condition for the experiment, it is essential to bake the vacuum vessel for obtaining high-quality vacuum condition. Therefore the vacuum conditioning has been performed in order to remove various kinds of impurities including H₂O, carbon and oxygen for the plasma. During the 1st KSTAR campaign, the first step of the vacuum conditioning at room temperature was vessel baking up to 100 °C by hot pressurized water that circulates through the water channels between inner and outer wall of the vacuum vessel [2]. The second step was RF-GDC with either hydrogen or helium. For the KSTAR 2nd campaign, the vacuum vessel baking temperature was increased from 100 °C to 130 °C and high temperature jacket heater was installed to heat up the pumping duct to 120 °C.

The 2nd KSTAR campaign results, show that the outgassing rate of vacuum vessel was decreased as compared with the 1st KSTAR campaign in spite of additional installation of PFC in the vacuum vessel. It was concluded that baking methods and high temperature heater installed at pumping duct could be effective for the vacuum conditioning. To decrease outgassing rates in the 3rd KSTAR campaign, a hot gas baking system for the Plasma Facing Component (PFC) will be installed to supply the hot nitrogen gas whose temperature is 350 °C [3].

This paper describes the results of the KSTAR VPS along KSTAR campaign.

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