

DESIGN AND APPLICATION OF GDC ON EAST TOKAMAK

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Abstract

On the EAST Tokamak, DC glow discharge (GDC) is employed to clean the first wall of plasma. It is an effective method for controlling the recycle of H on the chamber wall, C, O impurity and improving the wall conditioning. There are four DC GDCs which distribute equally on the EAST Tokamak vacuum vessel wall. Each GDC is equipped with an anode, a stainless steel cover and four support legs. The size of each anode is 25mm in diameter and 450mm in length. The anode is insulated from stainless steel cover with Al₂O₃ ceramics. The cover is linked directly to vacuum vessel wall through four support legs. After a round of experiment, the value of insulation resistance of Al₂O₃ ceramics decrease remarkably due to atom sputtering. To protect the insulation ceramics, ceramic protection covers are employed on the GDC. Two extension pipes made of ceramics are added on the anode. And the height of insulation cylinder is also increased. The insulation resistance of each GDC between anode and ground is raised highly. When the vacuum degree of Vacuum Vessel (VV) of reaches 4Pa, H₂-GDC is begun. The voltage added on two poles is 1000V and the current is 0.5A. Maintaining the gas pressure in 9×10^{-1} Pa, voltage in 370-390V and the current in 2A, GDCs run steadily. He-GDC is employed to remove the rudimental H₂. When the vacuum degree reaches 5.5Pa, He-GDC is started. The voltage added on two poles is 1000V and the current is 0.6A. Maintaining the gas pressure in 5×10^{-1} Pa, voltage in 160-200V and the current in 3A, GDCs run steadily. After GDC cleaning, the percentage of remaining gases in VV is changed greatly and vacuum degree of VV can reach high easily.

Key Words: EAST, glow discharge, optimization

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