

§63. Oxygen Gettering Properties of Boron Films on Graphite Liner

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Boron film coated on plasma facing walls has been utilized to reduce the oxygen impurity level by the gettering action. The boron film is also useful to reduce the hydrogen recycling.

In this study, the boronization was conducted by a dc glow discharge with a mixture gas of diborane and helium for a graphite liner. After the boronization, the oxygen glow discharge was carried out to evaluate the gettered oxygen amount. The state of the oxygen in the surface was also examined. The oxygen gettering properties of the boron film on graphite were compared with the case of boron film on a SS liner.

The change of oxygen partial pressure during the oxygen discharge is shown in Fig.1. The gettered oxygen amount in the case of the graphite liner was about twice larger than that in the case of the SS liner. The depth atomic composition of the boron film after the oxygen discharge is shown in Fig.2. The oxygen was trapped in the depth range from the top surface to 100 nm. The depth was several times larger than that in the case of SS, 20-30 nm. The oxygen was observed to be chemically bonded with the boron.

After the oxygen discharge, the helium discharge was conducted to recover the oxygen gettering ability. After the helium discharge, the oxygen discharge was again carried out. The gettered oxygen amount in the case of graphite was comparable with that in the case of SS.

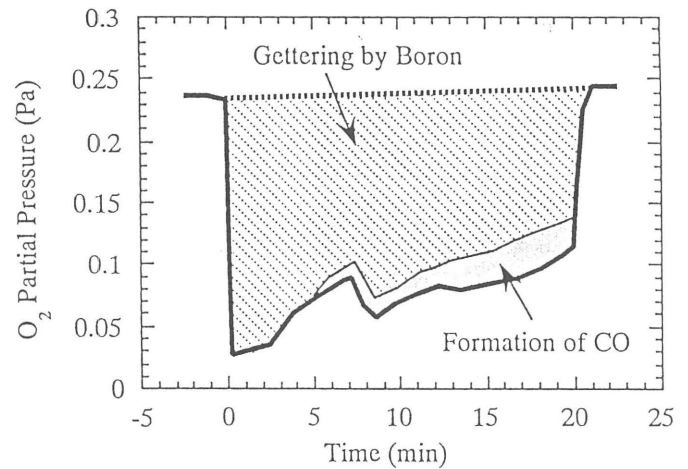


Fig.1 Change of O₂ partial pressure during oxygen discharge.

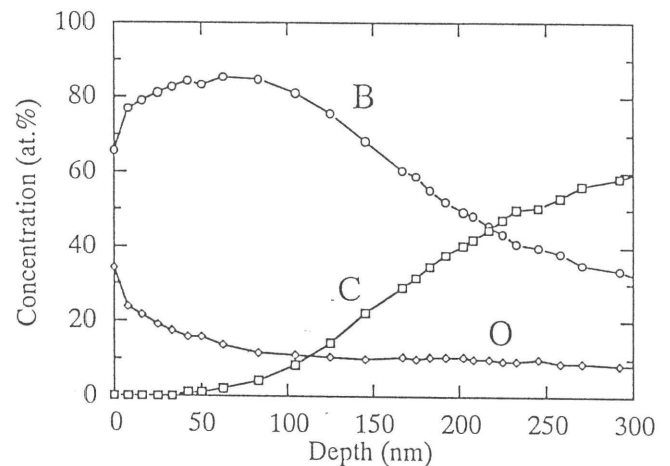


Fig.2 Depth atomic composition of boron film on graphite, after oxygen discharge.

References

- 1) Hino T. et al, Oxygen Gettering Properties of Boron Film Production by Diborane dc Glow Discharge, To be appeared in J.Nucl.Mater. (1997)