

Abstract Submitted
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Plasma Performance Study on an All-metal Tokamak – Alcator C-Mod¹ YIJUN LIN, B. LIPSCHULTZ, E. MARMAR, M. GREENWALD, A. HUBBARD, I. HUTCHINSON, J. IRBY, B. LABOMBARD, M. REINKE, J. RICE, S. SCOTT, J. TERRY, D. WHYTE, S. WOLFE, S. WUKITCH, MIT, PSFC, AL-CATOR C-MOD TEAM — High-Z plasma facing components (PFCs) are being considered by ITER owing to their advantages such as low tritium retention and high heat flux handling capability. After replacing all boron nitride (BN) protection tiles on the ICRF antennas with molybdenum tiles and removing boron residues on the in-vessel Mo tiles, we transformed Alcator C-Mod back to a genuine all-metal tokamak prior to the FY2005 experimental campaign. The ICRF antennas were found to have the same power and voltage handling capabilities as previously with BN tiles. The RF heated H-mode performance with plain Mo wall was rather poor with $H_{99} \sim 1.0$ along with high radiated power. Boronization was shown to be necessary in obtaining the best performance plasmas, by reducing the Mo level and radiated power in the plasma. We have carried out experiments to study the effect of boronization at different boron deposition locations. A variety of boronization techniques, including electron cyclotron discharge, glow discharge, and between-shot boronization, has been compared. A new world tokamak record of volume average pressure $\langle P \rangle = 1.8$ atmosphere, at ITER B field and ITER beta normal, was achieved in Alcator C-Mod with a boronized all-metal wall.

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