OEDGE modeling of the DIII-D double null $^{13}CH_4$ puffing experiment

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Abstract

ITER plans to use a single null configuration with a secondary upper X-point just outside the upper target. The plasma interaction at the ITER secondary outer strike point was simulated on DIII-D using an unbalanced double null ELMy H-mode configuration. The measured plasma conditions in the outer secondary divertor closely duplicated those projected for ITER. $^{13}CH_4$ was injected into the secondary outer divertor to simulate sputtering there. The majority of the ^{13}C found was in the secondary outer divertor. This material migration pattern is radically different than that observed for main wall $^{13}CH_4$ injections into single null configurations where the deposition is primarily at the inner divertor. The implications for tritium codeposition resulting from sputtering at the secondary divertor in ITER are significant since release of tritium from Be co-deposits at the main wall bake temperature for ITER, 240°C, is incomplete. The principal features of the measured ^{13}C deposition pattern have been replicated by the OEDGE interpretive code.

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