

Divertor and Midplane Materials Evaluation Systems in DIII-D*

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The Divertor Materials Evaluation System (DiMES) at General Atomics has successfully advanced the understanding of plasma surface interaction phenomena involving ITER relevant materials, and has been utilized for advanced diagnostic designs in the lower divertor of DIII-D. Surface material erosion and redeposition results were used to benchmark modeling codes. This paper will summarize results on a series of recent successful experiments. These include the study of carbon deposition in gaps and on metallic mirrors as a function of temperature, studies of methane injection to benchmark chemical sputtering diagnostics, migration of C-dust from the divertor, and the measurement of charge exchange neutrals with a hydrogen sensor. In concert with the modification of the lower divertor of DIII-D, the DiMES sample vertical location has been modified to match the raised divertor height. The new Midplane Material Exposure Sample (MiMES) design will also be presented. MiMES will allow the study and measurement of erosion and redeposition of material at the outboard midplane of DIII-D, including effects from convective transport. We will continue to expose relevant materials and advanced diagnostics to different plasma configurations under various operational regimes. Planning and proposals of near term experiments to address the PSI issues for ITER and beyond will be presented, including material erosion and re-deposition experiments, gaps and mirror exposures at elevated temperature.

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