

First Tests of Molybdenum Mirrors for ITER Diagnostics in DIII-D Divertor

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Metallic mirrors will be used in ITER for optical diagnostics working in different spectral ranges. Their optical properties will change with time due to erosion, deposition and particle implantation. For mirrors placed in the ITER divertor, deposition is the most serious concern. Dedicated experiments aimed at predicting the expected deposition rates and developing techniques for deposition mitigation are urgently needed. First tests of molybdenum mirrors in DIII-D divertor were performed under deposition-dominated conditions like those expected in the ITER divertor. Two sets of mirrors recessed 2 cm below the divertor floor in the private flux region were exposed to a series of identical lower single null ELMy H-mode discharges. The first set of mirrors was maintained at room temperature during the exposure and exhibited carbon deposition at a maximum rate of 3 nm/s. The second set was exposed at elevated temperature between 140°C and 80°C. Carbon deposition on the heated mirrors was fully suppressed and the degradation of their optical reflectivity was minimized. This work was supported by the U.S. Department of Energy under DE-FG02-04ER54758, W-7405-ENG-48, DE-FC02-04ER54698, and DE-AC04-94AL85000, and performed in the framework of bilateral U.S.-EURATOM Exchange program.