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Graphene as a Coating for Plasma Facing Components[1] MARCOS NAVARRO, MARZIYEH ZAMIRI, GERALD KULCINSKI, MAX LAGALLY, JOHN SANTARIUS, University of Wisconsin-Madison — This research explores the protection by graphene of plasma facing materials bombarded with energetic ions of helium. Few studies have shown that graphene can act as a protective layer against sputtering due to energetic ions. In the presence of such irradiation, plasma facing components (PFC's) tend to develop surface morphologies that lead to the sputtering of wall material, potentially diminishing the lifetime of the PFC's and plasma performance. Since plasmas have broad applications and the quality of transferred and grown graphene is different, we have used a chemical vapor deposition method to grow on other substrates. We have also shown that graphene can reduce changes on surface morphology due to energetic helium. After irradiation, in the case of graphene-covered tungsten, our results show that, compared to the uncovered W, graphene suppresses these morphologies that form on the surface of hot W. Using Raman spectroscopy as a diagnostic, the graphene coating shows little sign of damage after being irradiated, indicating that there is little to no sputtering of carbon impurities from the surface. We have determined that the mass losses in W have been reduced significantly, which may lead to an improved plasma performance and longer PFC lifetimes.

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Marcos Navarro
University of Wisconsin-Madison

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