

Heavy-ion induced desorption of a TiZrV coated vacuum chamber bombarded with 5 MeV/u Ar⁸⁺ beam at grazing incidence

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TiZrV nonevaporable getter (NEG) coated vacuum chambers is a new vacuum technology which is already used in many particle accelerators worldwide. This coating is also of interest for heavy-ion accelerator vacuum chambers. Heavy-ion desorption yields from an activated as well as a CO saturated NEG coated tube have been measured with 5 MeV/u Ar⁸⁺ beam. The sticking probability of the NEG film was obtained by using the partial pressure ratios on two sides of the NEG coated tube. These ratios were compared to results of modeling of the experimental setup with test particle Monte Carlo and angular coefficient methods. The partial pressures inside the saturated NEG coated tube bombarded with heavy ions were up to 20 times larger than those inside the activated one. However, the partial pressure of methane remained the same. The value of the total desorption yield from the activated NEG coated tube is 2600 molecules/ion. The desorption yields after saturation for CH₄, H₂, and CO₂ were found to be very close to the yields measured after the activation, while CO increased by up to a factor of 5. The total desorption yield for the saturated tube is up to 7000 molecules/ion. The large value of the desorption yield of the activated NEG coated tube, an order of magnitude higher than the desorption yield from a stainless steel tube at normal incident angle, could be explained by the grazing incident angle.