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Study on the lifespan and post-storage performance of NEG coated vacuum chambers

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NEG coated vacuum chambers provide an effective route for the acquisition of ultra-high vacuum in the diffraction limited storage rings. The lifespan and post-storage performance of the NEG films greatly affect the long-term stability and reliability of vacuum systems. In this work, Ti-Zr-V films were deposited on the inte-rior surface of the small aperture copper chamber using DC magnetron sputtering. The lifespan of the NEG coated vacuum chambers were characterized by nitro-gen venting-activation cycles and neon venting-activation cycles, respectively. The pumping properties of the NEG coated vacuum chambers were evaluated after six months of storage in vacuum, nitrogen and neon environments. The results indicate that the ageing of the NEG coated vacuum chamber can be improved by increasing the activation temperature and prolonging the duration of activation in the nitrogen venting-activation cycles. Nevertheless, the NEG coated vacu-um chamber exhibits low performance deterioration in the high-purity neon venting-activation cycles. Under the three storage conditions, almost no degradation can be observed in the pumping speed of NEG coated vacu-um chambers.

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