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Lifetime of non-evaporable getter thin films over repeated activation

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Non-evaporable getter (NEG) coatings are used in accelerator beamlines to create an area of distributed pumping, allowing less external pumps to be installed, and smaller diameter tubes to be used. Both giving way to greater space for magnet arrays to better control the beam within, allowing more efficient accelerators to be produced. To work, NEG coatings must be activated by heating to a set temperature for 24 hours. This temperature depends on the properties of the NEG coating, and requirements of the system. The coating is then able to pump residual gasses out of the vacuum system, until it becomes saturated and will once again need activating. Over its a lifetime, a NEG coating will be activated and saturated numerous times, each time reducing the available sites for molecules to diffuse to during activation. Thus, eventually, the NEG coating will lose its capability, and will no longer be able to reach the same pumping capacity from the same activation regime. This study investigates the limits of NEG lifetimes, looking at the effect of multiple activations on the same coating. Samples of diameter 35 mm and length 50 cm were characterized by CO and H₂ injections, from which the sticking probabilities and NEG coating capacity could be obtained. The samples were activated numerous times to see any degradation of the NEG coating. The results will be presented and discussed at IPAC 2024.

Footnotes

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