Contribution ID: **129** Type: **Poster**

NEG coatings on small diameter vacuum chambers for Hefei Advanced Light Source

Wednesday 20 June 2018 18:00 (20 minutes)

Hefei advanced light source is the fourth generation Diffraction-Limited Storage Ring, which reduces aperture of vacuum chambers to few centimeters. General pumps cannot satisfy the ultrahigh vacuum due to conductance limitation and the intense photon bombardment. Most of the beam pipes need to be deposited with Ti-Zr-V nonevaporable getter (NEG) thin films in order to provide distributed pumping and low gas desorption, and allow to achieve low pressure in narrow and conductance limited chambers. In this paper, NEG will be deposited by DC and pulsed DC magnetron sputtering using Ti-Zr-V alloy wire sputter-targets. The optimizations of the coating properties are achieved by varying deposition parameters, such as pressure, power, magnetic field and so on. The coating properties are analyzed by different materials characterization methods. The vacuum performance related to coating properties is evaluated by the measurement of pumping speed and surface coverage in the end.

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Session Classification: Poster Session Wednesday

Track Classification: Thin Film & Surface Engineering