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NEG coating and thermal coating spray of vacuum chamber

Wednesday 13 August 2025 16:00 (2 hours)

As the fourth-generation synchrotron radiation light source, vacuum chambers with small apertures were employed for high energy photon source (HEPS), making the performance of Non-evaporable getter (NEG) coating is very crucial for its vacuum system. After years of development, the highly stability of the NEG coating has been achieved. Massive production facilities of NEG coated vacuum chambers have been developed for HEPS in Huairou, Beijing, which based on the NEG coating prototypes. The facilities can achieve simultaneous coating of 16~20 vacuum chambers of HEPS including irregular shaped vacuum chambers. The pumping performance of the NEG coated vacuum chambers has been measured by test facilities. After heated at 200℃ for 24 hours, the highest pumping speed of H2 is about 0.65 l/scm2, and the highest capacity of CO is about 1.89×10-5 mbar·L/cm2. The lifetime is more than 20 cycles of air exposure and re-activation. Multilayer thermal coating spray have been studying and preliminary test shows that the heating temperature could reach 300 ℃, and after more than 12 times reheating, the spraying layer also shows a good adhesion.
The baking is the most crucial procedure in achieving ultra-high vacuum. Due to NEG coating reactivation and degassing, to meet the ultra-high vacuum requirement of achieving a dynamic vacuum level of ~10-10 mbar. Multilayer thermal coating will be coated outside of the vacuum chamber which composited by ceramic and conductivity layer, the heating temperature could reach 300℃.

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Footnotes

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