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Recent Results on NEG Coating Characterisation

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The non-evaporable getter (NEG) coating is an important component of vacuum systems in many current particle accelerators due to its high evenly distributed pumping speed and low thermal outgassing and electron, photon and ion stimulated desorption yields. Coatings made of compound materials, e.g. TiZrV or TiZrHfV, have been found to have the highest sticking probabilities and lowest desorption yields. However, multi-metal targets are difficult and expensive to manufacture. Moreover, having a single-metal target would allow for deposition of a more uniform coating on vacuum chambers of various shapes and sizes. In this work, an analysis of two NEG-coated tubular samples with dense and columnar single-metal zirconium film structure will be demonstrated. Obtained sticking probabilities, pumping capacities and electron stimulated desorption (ESD) yields show that Zr coating is a good candidate material to replace TiZrV thin films in accelerator vacuum chambers. The columnar coating is fully activated at 160℃ and has sticking probability close to 0.2, which is comparable to that of the ternary NEG coating activated at the same temperature, while ESD yields are also similar to the ones measured from TiZrV samples. Another important aspect to be considered before installing NEG-coated parts in future accelerators like FCC is a low temperature of the beam screen. There is a lack of knowledge about the behaviour of the NEG coating at cryogenic temperatures, and this study will provide data on how sticking probability and ESD yields depend on the temperature of the NEG film. The experimental setup and procedure will be explained, along with preliminary results obtained by testing two columnar TiZrV samples.

Author: SIRVINSKAITE, Ruta (University of Loughborough)

Co-authors: MALYSHEV, Oleg (STFC Daresbury Laboratory); Dr VALIZADEH, Reza (STFC Daresbury Laboratory); HANNAH, Adrian (Science Technology Facilities Council); CROPPER, Michael D.

Presenter: SIRVINSKAITE, Ruta (University of Loughborough)

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