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Single Metal Zirconium Non-Evaporable Getter Coating

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The non-evaporable getter (NEG) coating has been used for years in many accelerators due to its advantages such as evenly distributed pumping speed, low thermal outgassing and low photon and electron stimulated desorption yields. Although quaternary Ti-Zr-Hf-V coating deposited from an alloy wire has been found to have the lowest desorption yields, highest sticking probability and sorption capacity, it is hard to find a manufacturer for such a target. Twisted wire targets occupy more space and are not good for coating narrow chambers. Single element targets are widely available and can be produced in a form of a wire that is easy to apply for a uniform coating of various shapes of vacuum chambers. Pure Zr coating is being tested to find a more efficient and cheaper way of producing the NEG coated chamber parts. In this work, three samples coated with pure Zr (dense and columnar) were analysed and results for pumping properties and electron stimulated desorption (ESD) obtained. Pure Zr coating has shown the results that, although not as good as the ones achieved with the quaternary NEG film, could be an economic solution in practical applications. It shows that columnar Zr coating can be activated at 160°C, the temperature close to the Ti-Zr-Hf-V activation temperature and lower than the one for the widely used ternary Ti-Zr-V alloy.

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