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Study on the vacuum properties of laser-etched oxygen-free copper

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The performance of operating particle accelerators has been seriously affected by the electron cloud (e-cloud) effect. The secondary electron emission (SEE) and the e-cloud can be effectively suppressed through laser-etching the inner surface of the vacuum chamber. Oxygen-free copper (OFC) has become the first choice for the vacuum chambers of modern accelerators due to its high electric and thermal conductivity and effective radiation shielding property. It is necessary to study the vacuum properties of the laser-etched OFC for the application in the particle accelerators. In this paper, the photon stimulated desorption (PSD) yield and the outgassing rate of the laser-etched OFC were measured. The results show that the laser-etched OFC presents lower PSD yield compared to the untreated OFC, while the outgassing rates of the laser-etched and unetched samples are similar.

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