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Effects of the Fabrication and Preparation Processes on the SEY of Niobium SRF Cavities MILOS BASOVIC, Old Dominion University, CAS, ANA SAMOLOV, University of Massachusetts Boston, SVETOZAR POPOVIC, LEPSHA VUSKOVIC, Old Dominion University, CAS — We are reporting progress on effects of the plasma treated surface on the Secondary Electron Yield (SEY) of Niobium (Nb) samples. Fabrication and preparation processes affect intrinsic quality factor (Q factor) to a great extent contributing to multipacting. Multipacting is a resonant phenomenon occurring as an electron buildup and degrading the maximum Q factor achievable by cavity. Apart from the initial impurities of the Nb sheet metal used for cavity fabrication, additional inclusions on the surface of the cavity are added by forming and welding of the components. Operation of the cavities is affected by these inclusions in such a way that it decreases the overall performance of the accelerators. Performance of the cavities can be improved by manipulating the parameters or by mitigating the consequences of the fabrication and preparation processes. We are testing the influence of the electron beam welding and various surface treatments on Nb samples by measuring the SEY of coin-like samples with the surface treated in several different methods. The system is designed to measure energy distribution of SEY of the samples under several incident angles. Comparison is being made between non-treated and treated surface, as well as effects of each treatment on SEY of the surface. Our aim is to show which of the surface treatments or combination of them are beneficial to reducing SEY of the cavity surface.

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