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# Impact of dry ice cleaning on the enhanced field emission from flat Cu samples

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Enhanced field emission (EFE), resulting in dark currents and electric breakdowns, is one of the main gradient limitations for the CLIC accelerating structures (actual design Eacc = 100 MV/m, Epeak = 240 MV/m) [1]. Measurements on diamond-turned, flat (Ra = 158 nm) Cu samples showed first EFE at surface fields Es = 130 MV/m [2]. In order to reduce EFE, we have installed a commercial dry ice cleaning (DIC) system in our clean room (class iso 5). As expected, the number density of emitters (N) was significantly decreased from N = 52 cm-2 to N = 12 cm-2 at Es = 190 MV/m after DIC. Furthermore we have tested two diamond-turned and chemically etched (SLAC treatment, Ra = 150 nm) Cu samples after DIC resulting in first EFE at 230 MV/m. Locally measured I(V) characteristics of the strongest emitters revealed field enhancement factors $\beta = 10 - 90$ on the diamond-turned sample and $\beta = 10 - 85$ on the chemically etched samples. SEM and EDX investigations of the located emission sites will be presented at the workshop.

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