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Hydrogen Outgassing in Stainless Steel Gun Chambers MELISSA RICKETTS — Vacuum quality is an important aspect in electron guns. The hydrogen outgassing rate is a determinant of the vacuum quality in stainless steel gun chambers. A low outgassing rate allows for a better vacuum and therefore a longer photocathode lifetime. Low outgassing rates depend on thermal treatments of the chamber. The purpose of this project is to put together a gun chamber, and assess the hydrogen outgassing rate after an administered thermal treatment. To determine the hydrogen outgassing rate, pressure measurements of the vacuum chamber must be taken. Once these measurements have been obtained, they can be used along with the known volume and surface area of the chamber to calculate the outgassing rate. A thermal treatment of 400 $^{\circ}$C for nine days achieved an outgassing rate of 1.12 x 10^{-13} Torr L /s cm^2. The value obtained for the hydrogen outgassing rate is one order of magnitude better than previous outgassing rates. This is because in the past, this specific thermal treatment has never been used. This improvement illustrates the success of the project.

Melissa Ricketts

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