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# Generation of Gas Bubbles in a Fissioning Uranyl Sulfate Solution Using an Electron Beam Linac

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## ABSTRACT

In support of the development of accelerator-driven production of fission product Mo-99 as proposed by SHINE Medical Technologies, a 35 MeV electron linac was used to irradiate depleted-uranium (DU) uranyl sulfate dissolved in pH 1 sulfuric acid at average power densities of 6 kW, 12 kW, and 15 kW. During these irradiations, gas bubbles were generated in solution due to the radiolytic decomposition of water molecules in the solution. Multiple video cameras were used to record the behavior of bubble generation and transport in the solution. Seven six-channel thermocouples were used to record temperature gradients in the solution from self-heating. Measurements of hydrogen and oxygen concentrations in a helium sweep gas were recorded by a gas chromatograph to estimate production rates during irradiation. These data are being used to validate a computational fluid dynamics (CFD) model of the experiment that includes multiphase flow and a custom bubble injection model for the solution region.

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