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Lawrence Livermore Laboratory

THE DT FUSION NEUTRON IRRADIATION OF LLL STORM - May 17, 1978

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The JF Fusion Neutron Irradiation of LLL Niobium

March 29, 1978

Susan C. Marlean

Dr. Richard H. Howell of LLL reserved the LLL Rotating Target Neutron Source (RTNS) for the week of February 13-17, 1978.

The niobium dosimetry foils used during the irradiation measured 12 mm in diameter and 0.01 cm in thickness.

The L Division Accelerator Staff carried out the irradiation. Neutron production was monitored continuously with a proton recoil counter and recorded each hour. The dose record is attached. Total beam-on time was 71.58 hours.

The niobium foils were stored for a few days before being delivered to Ruth Anderson in the LLL Nuclear Chemistry Division for gamma ray counting.

The average fluence of each dosimetry foil was calculated using the method described in UCRL-71191, Sec. 1. However, the cross section used for the activation of the 10.14 day isomer of niobium by 14.8 MeV neutrons was changed to 661 millibarns (UCRL-80097). The results were as follows:

<u>Dosimetry Foil</u>	<u>Fluence (neutrons/cm²)</u>
Nb-921	6.15×10^{16}
Nb-922	7.79×10^{16}
Nb-927	1.61×10^{16}
Nb-931	2.57×10^{16}
Nb-932	1.00×10^{16}
Nb-936	1.09×10^{17}
Nb-939	3.96×10^{15}
Nb-941	2.18×10^{15}
Nb-943	7.31×10^{15}
Nb-944	8.21×10^{14}
Nb-945	1.42×10^{15}
Nb-947	4.95×10^{14}
Nb-948	2.51×10^{14}
Nb-950	8.55×10^{16}
Nb-951	8.12×10^{16}
Nb-952	8.65×10^{16}
Nb-953	9.25×10^{16}
Nb-954	4.70×10^{16}
Nb-955	7.75×10^{16}

The estimated overall uncertainty of these results is $\pm 7.5\%$. The relative uncertainty between any two values is about $\pm 2\%$. The fluences given here represent average fluences over the volume of each dosimetry foil.

RTNS IRRADIATION OF FEBRUARY 13 TO 17, 1978

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