



National Bureau of Standards

Certificate

Standard Reference Material 4906L-C Radioactivity Standard

Radionuclide	Plutonium-238 ^{(1)*}
Source identification	4906L-C-
2 π alpha-particle emission rate	s ⁻¹ ⁽²⁾
Overall 2 π uncertainty	1.4 percent ⁽³⁾
Activity	Bq
Overall activity uncertainty	1.5 percent ⁽⁴⁾
Reference time	1200 EST August 17, 1988
Radionuclide impurities (Activity ratio at reference time)	²⁴¹ Am/ ²³⁸ Pu: 6.5 x 10 ⁻⁵ ⁽⁵⁾ ²⁴⁰ Pu/ ²³⁸ Pu: <4.0 x 10 ⁻⁵ ²³⁹ Pu/ ²³⁸ Pu: <2.4 x 10 ⁻⁵
Half life	87.74 \pm 0.04 years ⁽⁶⁾
Measuring instrument	NBS 2 $\pi\alpha$ proportional counter

This Standard Reference Material was prepared in the Center for Radiation Research, Ionizing Radiation Division, Radioactivity Group, Dale D. Hoppes, Group Leader.

Gaithersburg, MD 20899
August, 1988

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

*Notes on back

NOTES

- (1) A practically weightless source electroplated onto a 0.025-cm-thick platinum foil 0.6 cm in diameter which is cemented to a stainless-steel disk 2.54 cm in diameter and 0.16-cm thick.

- (2) The overall uncertainty in the $2\pi\alpha$ emission rate was formed by taking three times the quadratic combination of the standard deviations of the mean, or approximations thereof, for the following:
 - a) one standard deviation of the mean 0.20 percent
 - b) count-rate vs. energy extrapolation to zero energy 0.40 percent
 - c) system live time 0.05 percent

- (3) The activity is calculated from the emission rate into 2π steradians and the measured ratio of alpha particles emitted into 2π to the alpha particles emitted into 4π , 0.5060 ± 0.19 percent.

- (4) The overall uncertainty in the activity, 1.5 percent, was formed by taking three times the quadratic combination of the standard deviations of the mean of the $2\pi\alpha$ measurements and the approximated standard deviation of the above backscatter correction.

- (5) An impurity search was performed at NBS using a Ge detector.

- (6) NCRP Report No. 58, 2nd Edition, February 1985, p. 505.

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