

# National Bureau of Standards

## Certificate

### Standard Reference Material 4322

#### Alpha-Particle-Solution Standard

Radionuclide	Americium-241
Source identification	SRM 4322
Source description	Liquid in 5-mL flame-sealed glass ampoule
Source mass	Approximately 5.2 grams
Source composition	Americium-241 in 1-molar nitric acid
Reference time	1200 EST, 1 November 1986
Radioactivity concentration	38.66 Bq g <sup>-1</sup>
Overall uncertainty	0.81 percent (1)*
Alpha-particle-emitting impurities (Activities at reference time)	None detected (2)
Measuring instrument	NBS "0.1π"α defined-solid-angle counter with scintillation detector
Half life	432.2 ± 0.5 years (3)

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  
November, 1986

Stanley D. Rasberry, Chief  
Office of Standard Reference Materials

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NOTES

- (1) Individual uncertainties have the significance of one standard deviation of the mean, or an approximation thereof. The combined uncertainty is the individual uncertainties shown below added in quadrature. The overall uncertainty is taken to be three times the combined uncertainty.

<u>Source of uncertainty</u>	<u>Uncertainty (%)</u>
a) alpha-particle-emission-rate measurements	0.16
b) gravimetric measurements	0.05
c) deadtime	0.05
d) background	0.03
e) detection efficiency	0.10
f) count-rate-vs-energy extrapolation to zero energy	0.15
g) half life	0.00
h) alpha-particle-emitting impurities	0.10
Combined uncertainty	<u>0.27</u>
	* 3
Overall uncertainty	<u>0.81</u>

- (2) The limit of detection for alpha-particle-emitting impurities is  $0.004 \text{ } \alpha\text{s}^{-1}\text{g}^{-1}$  for energies greater than 5.60 MeV.

The material was also examined for photon-emitting impurities and none were found. The limit of detection for photon-emitting impurities is  $0.002 \text{ } \gamma\text{s}^{-1}\text{g}^{-1}$  for energies between 90 and 1900 keV.

- (3) NCRP Report No. 58, Second Edition (1985) p. 365.

For further information call Larry Lucas at (301) 975-5546.