

# National Bureau of Standards Certificate Standard Reference Material 4405L Radioactivity Standard Gold-198

This Standard Reference Material consists of gold-198 in  $\frac{1}{100}$  grams of carrier solution in a flame-sealed borosilicate glass ampoule. The carrier solution contains approximately 0.13 mg/ml  $\text{KAu}(\text{CN})_4$  and 0.08 mg/ml KCN, and its density is  $0.998 \pm 0.002$  g/ml at  $22^\circ\text{C}$ .

The activity of the gold-198 in nuclear transformations per second per gram of solution at 1200 EST December 6, 1975, was

$$*5.82_0 \times 10^6 \pm 1.5_4\%*.$$

This Standard Reference Material was measured in the National Bureau of Standards "4 $\pi$ "  $\gamma$  ionization chamber which had previously been calibrated with gold-198 solutions from which quantitative sources had been prepared and measured with 4 $\pi\beta$ -proportional and 4 $\pi\beta$ - $\gamma$  coincidence counting systems.

The uncertainty in the value of the activity, 1.5 $_4$  percent, is the linear sum of 0.04 percent, which is the limit of the random error at the 99-percent confidence level ( $2.831 S_m$ , where  $S_m$  is the standard error computed from 22 groups of measurements) and 1.5 $_0$  percent, which is the estimated upper limit of conceivable systematic errors.

The solution from which this Standard Reference Material was prepared was examined for photon-emitting impurities with a Ge(Li) spectrometer and gold-199 was found to be present. On December 6, 1975 at 1200 EST, the ratio of the activity of gold-199 to that of gold-198 was  $0.0236 \pm 0.0024$ . It is estimated that any radionuclide emitting a photon with energy less than 412 keV and having an emission rate greater than  $10^{-3}$  that of the 412 keV gamma ray of gold-198 would have been detected; the corresponding limit for any gamma ray with energy greater than 412 keV is  $10^{-4}$ .

This Standard Reference Material was prepared in the Center for Radiation Research, Radioactivity Section, W. B. Mann, Chief.

Washington, D. C. 20234  
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J. Paul Cali, Chief  
Office of Standard Reference Materials

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