

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

This Standard Reference Material consists of gold-198 in \_\_\_\_\_ grams of carrier solution in a flame-sealed borosilicate glass ampoule. The carrier solution contains approximately 2.2 mg/ml  $\text{KAu}(\text{CN})_4$  and 1 mg/ml KCN, and its density is  $1.015 \pm 0.002$  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

$$*5.67_0 \times 10^8 \pm 1.55\%*$$

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, 1.55 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 1.51 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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Office of Standard Reference Materials

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