UNDECAGOLD

Nanoprobes

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PRODUCT INFORMATION SHEET

NEGATIVELY CHARGED UNDECAGOLD, $[Au_{11}(P)_7Cl_3]$

Product Name:	NEGATIVELY CHARGED UNDECAGOLD
Catalog Number:	2044
Appearance:	Yellow-orange solid
Revision:	1.1 (March 2000)

GENERAL INFORMATION

UNDECAGOLD is a new type of gold label, consisting of a cluster complex of 11 gold atoms, ligated by triarylphosphines and chloride ions. Each molecule of NEGATIVELY CHARGED UNDECAGOLD bears multiple carboxylic acid groups; these may ionize and assume a negative charge. They may also be used for the attachment of labels, via established cross-linking protocols. UNDECAGOLD particles are a uniform 0.8 nm in diameter, making them a suitable calibration standard for electron microscopy. They do not aggregate, as do colloidal gold products, nor do they possess affinity for proteins as colloidal gold particles do.

NEGATIVELY CHARGED UNDECAGOLD particles should be frozen upon receipt, and stored at -20°C.

Warning: For research use only. Not recommended or intended for diagnosis of disease in humans or animals. Do not use internally or externally in humans or animals. Non radioactive and non carcinogenic.

PRODUCT SPECIFICATIONS

NEGATIVELY CHARGED UNDECAGOLD is supplied as a solid, lyophilized from methanol/water: the 1 ml vial contains 50 nmol. It is purified by gel filtration, and is stable under a wide range of pH confitions. It is soluble in water and aqueous buffers, and also in organic solvents such as alcohols, acetone, dichloromethane and similar solvents. Solubility in non-polar organic solvents may be improved by treatment with a small amount of acid. Each molecule of NEGATIVELY CHARGED UNDECAGOLD contains approximately 21 carboxylic acid groups.

Extinction coefficients at specific wavelengths are given below for methanol solution:

WAVELENGTH (nm)	EXTINCTION COEFFICIENT*
280	1.677×10^5
420	0.471×10^5

*Measured for 5×10^{-6} M solution in methanol.

INSTRUCTIONS FOR USE

The product is supplied as a lyophilized pure solid; no buffers or other salts or residues are present. The yellow-orange solid may be dissolved directly into the buffer or solvent to be used.

Representative examples of the use of UNDECAGOLD for immunolabeling have been described in the literature.[1] This product may be used to label cellular features or biomolecules with a predominantly positive charge by electrostatic attraction. The carboxylic acid groups may also be cross-linked to other molecules using 1-ethyl-3-(3-Dimethylaminopropyl)carbodiimide hydrochloride (EDC) and sulfo-*N*-hydroxysuccinimide.[2]

SPECIAL CONSIDERATIONS FOR VIEWING UNDECAGOLD IN THE ELECTRON MICROSCOPE

UNDECAGOLD is the smallest gold probe commercially available, being just 0.8 nm in diameter. A high resolution instrument such as a Scanning Transmission Eelectron Microscope (STEM) is required for visualization; in a conventional TEM the UNDECAGOLD particles are not visible. With careful work, however, UNDECAGOLD may be seen directly in the STEM. However, achieving the high resolution necessary for this work may require new demands on your equipment and technique. Several suggestions follow:

1. Before you start a project with UNDECAGOLD it is helpful to see it so you know what to look for. Dilute the UNDECAGOLD stock 1:5 in methanol and apply 4 µl to a grid for 1 minute. Allow to dry.

2. View UNDECAGOLD using a full width scan of 128 nm or less; this will give sufficient magnification for visualization.

3. UNDECAGOLD is sensitive to beam damage (contrary to NANOGOLD® which is very beam-resistant); the behavior of UNDERCAGOLD in the STEM has been described in the literature.[3] Image at approximately 200 e Å^{-2}.

4. In order to operate at high magnification, thin carbon film over fenestrated holey film is recommended. Many plastic supports are unstable under these conditions of high magnification/high beam current and carbon is therefore preferred. Contrast is best using thinner films.

REFERENCES

1. Hainfeld, James F., in "Colloidal Gold: Principles, Methods and Applications," ed. M. A. Hayat, Academic Press, New York, NY, 1989: Vol. 2, p 413.

2. Staros, J. V.; Wright, R. W., and Swingle, D. M.; *Anal. Biochem.*, 156, 220 (1986).

3. Wall, J. S.; Hainfeld, J. F.; Bartlett, P. A., and Singer, S. J.; *Ultramicroscopy*, 8, 397 (1982).

Technical Assistance Available.

For a complete list of references citing this product, please visit our world-wide-web site at http://www.nanoprobes.com/Ref.html.