

Case example of the measurement using Puric ω ultrapure water

(Au nanoparticle analysis by SP(single particle)-ICP-MS)

Case example of measuring Au nanoparticles by SP-ICP-MS

PerkinElmer Japan cooperated for the analysis of Au nanoparticles by SP (single particle)-ICP-MS.

[Reference]

For nano analysis, ultrapure water is common to use rather than nitric acid or hydrochloric acid for the process to prevent samples from melting. So, Puric ω ultrapure water is used for preparing samples and standard solution for the analysis.

Analysis conditions

ICP-MS equipment conditions:
NexION ICP-MS (PerkinElmer)

Sample:

NIST RM8013 Gold Nanoparticles,
diameter 60nm (Reference value is approx. 56nm by TEM)

Nebulizer	Glass coax
Spray chamber	Glass cyclone
Cone	Sampler & Skimmer: Ni Hyper skimmer: Al
Staying time	50-70 μ s
Down time	0 μ s
Measuring time/sample	60-420sec

Methods : We adjusted the concentration of Au nanoparticles (NIST RM813) within the range 10 - 10,000 particles/mL using Puric ω ultrapure water and measured the average particle size by “the nanoparticle measurement mode.

Measurement results of Au nanoparticles

Concentration (particles/mL)	Average size (nm)	
	Measurement value	Tolerance(%)
10,000	61.2	2
1,000	61.2	2
100	61.6	3
10	60.9	1

Average of N=2

About the analysis results

The samples are required not to contain impurities as sampling measurement results used with ultrapure water will be the standard for application experiment. The average sizes of analyzed particles were in error less than by 3% for all adjustment concentration by SP-ICP-MS method, which means the highly accurate experiment. Hence, Puric ω ultrapure water is proved to be used for highly sensitive - Au nanoparticle analysis.



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