

ZETASIZER NANO S90/ZS90 SPECIFICATIONS DLS MAXIMUM SIZE LIMIT 10.0 (D.MM)

Introduction

For the Zetasizer Nano S90 or ZS90 instrument, the maximum size specification (diameter) is a peak mode of 3.0µm with a maximum size of 5.0µm. This technical note contains details of the experimental procedures and results obtained from measurements of a NIST traceable polystyrene latex standard as demonstration of these maximum size specifications.

Experimental

Materials

- 3mm polystyrene latex from the Thermo Scientific Duke Standards NIST traceable 4000 series (part number 4203A) supplied at a 1%w/v concentration
- 26% w/v sucrose
- Sizing cuvettes

Method

A 26% w/v solution of sucrose was prepared by taking 26g of sucrose and making up to 100g with deionized water. The polystyrene latex standard sample was prepared for measurement by adding 500µl of the latex to 500µl of the sucrose solution. This dilution gave a final polystyrene latex concentration of 0.5%w/v in 13%w/v sucrose. This dispersant was chosen to match the density of the latex, which has a density of 1.05, to prevent sedimentation. The measurements were taken at 25°C using a viscosity of 1.35mPa.s.

Results

The intensity size distributions obtained from 3 repeat measurements of the 3.0µm polystyrene latex dispersion are shown in figure 1. The sucrose peak is not seen as the scattering is overwhelmed by the scattering from the latex.

Figure 1: Intensity size distributions obtained from 3 repeat measurements of a traceable 3.0µm polystyrene latex suspended in 13% w/v sucrose solution

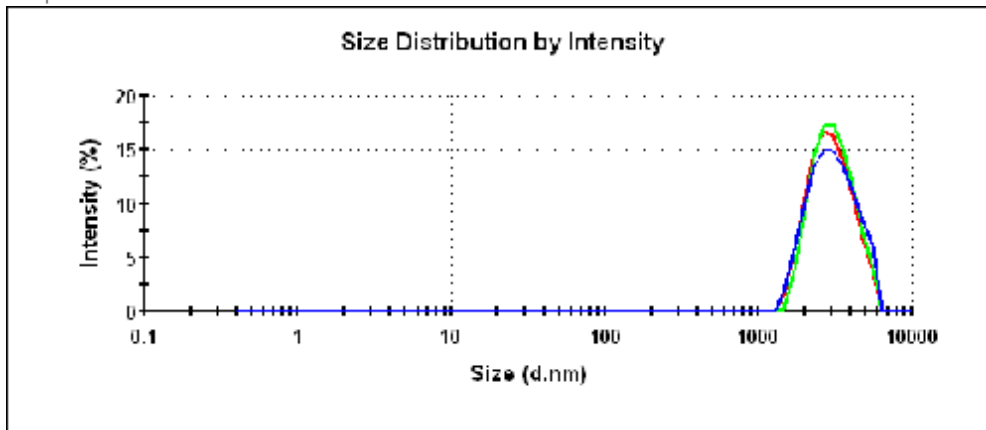


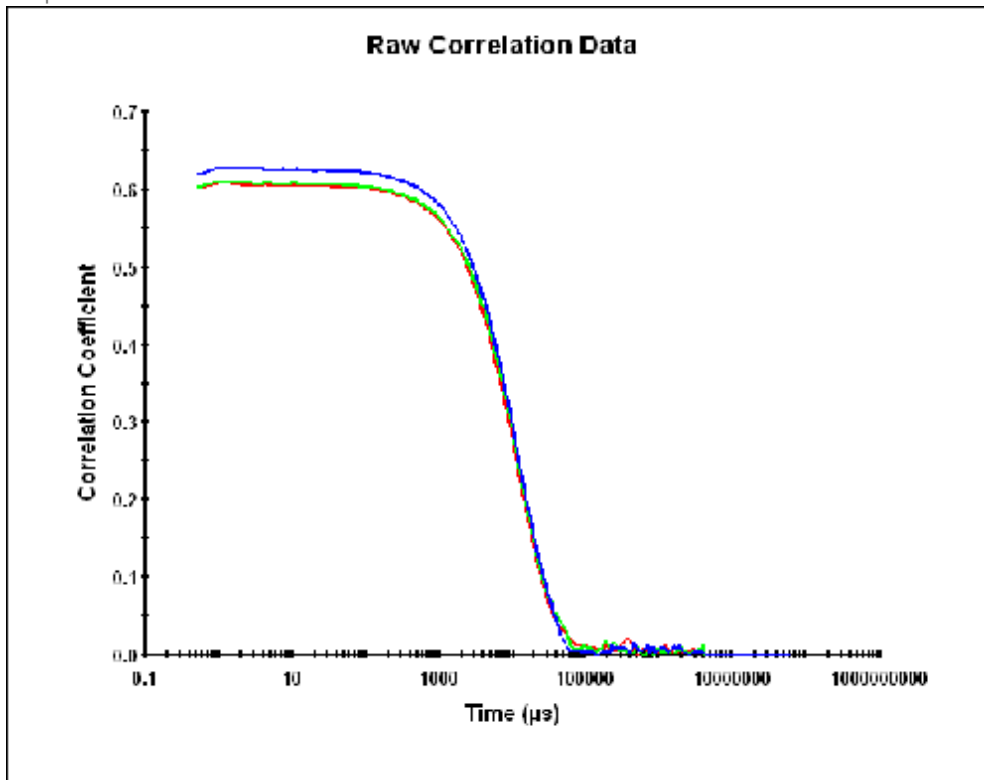
Table 1 is a summary of the 3 repeat measurements and shows the z-average diameters (in nanometers) and polydispersity index values obtained, together with the mean and standard deviation values.

Table 1: Summary of the 3 repeat measurements of a traceable 3.0µm polystyrene latex suspended in 13% w/v sucrose solution

Record	z-Average Diameter (nm)	Polydispersity Index
1	2799	0.148
2	2921	0.160
3	2987	0.142
Mean (SD)	2902 (95.4)	0.150 (0.009)

The limitation of the size for the 90 degree scattering optics in the Nano S90 and ZS90 is the appearance of number fluctuations. The overplot of the correlation function data (figure 2) shows some baseline noise, but no evidence of the secondary peaks due to number fluctuations, which indicates that the optics are inherently capable of measuring particles up to this size.

Figure 2: Correlation functions obtained from 3 repeat measurements of a traceable 3.0µm polystyrene latex suspended in 13% w/v sucrose solution



Conclusions

The results reported in this technical note confirm that the maximum size capability (diameter) for the Zetasizer Nano S90 or ZS90 is a peak mode of 3.0µm with a maximum size of 5.0µm.

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