**Zetasizer nano ZS**

**Equipment:** Zetasizer nano ZS (DLS, Malvern)

**No. of Equipment: UJEP23**

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**Equipment Description**

**Description of equipment:**

*Zetasizer nano ZS (Malvern)*

Description of principle and use:

Dynamic light scattering (DLS) is a non-invasive, well-established technique for measuring the size and size distribution of molecules and particles typically in the submicron region. Typical applications of dynamic light scattering are the characterization of particles, emulsions or molecules, which have been dispersed or dissolved in a liquid. The Brownian motion of particles or molecules in suspension causes laser light to be scattered at different intensities. Analysis of these intensity fluctuations yields the velocity of the Brownian motion and hence the particle size using the Stokes-Einstein relationship.

Specifications and technical features:

Temperature control range: 0°C - 90°C +/-0.1

Light source: He-Ne laser 633nm, Max 4mW.

Compliance with regulatory standards: ISO 13321, ISO 22412, 21 CFR Part 11.

**Size by dynamic light scattering**

Measurement range: 0.3nm – 10.0 microns (diameter).

Measurement principle: Dynamic Light Scattering

Minimum sample volume: 12µL

Accuracy: Better than +/-2% on NIST traceable latex standards

Precision / Repeatability: Better than +/-2% on NIST traceable latex standards

Sensitivity: 0.1mg/mL (Lysozyme)

**Zeta potential**

Measurement range: 3.8nm – 100 microns (diameter)

Measurement principle: Electrophoretic Light Scattering

Minimum sample volume: 150µL (20µL using diffusion barrier method)

Accuracy: 0.12µm.cm/V.s for aqueous systems using NIST SRM1980 standard reference material

Sensitivity: 10mg/mL (BSA)

**Molecular weight**

Measurement range: 980Da – 20MDa

Measurement principle: Static Light Scattering using Debye plot

Minimum sample volume: 12µL (3-5 sample concentrations required)

Accuracy: +/- 10% typical

**Specification of expertise relevant to NanoEnviCz workpackages:**

**WP3**a,c,e,f,h **WP4**a, **WP5**c, **WP6**a, **WP7**a,h

**Detailed description of expertise**

**Please, specify the main research topics connected with equipment**:

**Nanomaterials for biomedical applications**

Dendrimers (carbosilane, PEI, PAMAM, dendrimer-protein hybrid nanoparticles, dendrimer-nucleic acid complexes (dendriplexes))

Properties of colloidal nanoparticles

Properties of biomacromolecules and their conjugates with nanoparticles

**Please, specify the secondary research topics connected with equipment**:

Nanomaterials for industrial applications

**Keywords describing research area:**

Hydrodynamic diameter, zeta-potential, dynamic light scattering, nanoparticles

**Competence**

**Relevance for applied and industrial research:**

Studying the hydrodynamic size of nanoparticles in colloidal suspensions, quality control

**Relevance for fundamental studies:**

Characterization of size and properties of novel types of nanoparticles and biomacromolecules