

Characterisation of non-spherical particles in suspension using Depolarised DLS

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Non-spherical nanoparticles (eg cubic, tetrahedral or rod shaped) are important for a wide range of applications, with some advantages over spherical particles. In addition, some particles (such as nanodiamonds) have irregular shapes making them difficult to characterise by traditional techniques.

Many applications of nanoparticles require suspension in aqueous solutions (for example biological media). However, many traditional characterisation techniques (such as electron microscopy) require samples to be in a dry state. While these methods enable the determination of the core size of (hard) particles, they do not enable characterisation of their effective size in suspension, including the effect of surface stabilizers, or changes to particle size as a result of protein corona formation in biological media.

In this paper we will present advanced methods for the characterisation of non-spherical particles using depolarised dynamic light scattering and illustrate with a range of regular and irregular shaped particles, including particles with complex stabilising layers and protein coronae. The advantages and disadvantages of the technique will be discussed.

Keywords:

DLS, Nanorods, Non-spherical particles, Colloids, Protein Corona