

Electrophoretic methods for separation of nanoparticles

Abstract

This article reviews progress in the application of electrophoretic techniques for the separation of nanoparticles. Numerous types of nanoparticles have recently been synthesised and integrated into different products and procedures. Consequently, analytical methods for the efficient characterisation of nanoparticles are now required. Several studies have revealed that gel electrophoresis can readily be used for separating nanoparticles according to their size or shape. However, many other studies focused on separation of nanoparticles by CE. In some cases nanoparticles could be separated by CZE, simply using pure buffer as the BGE. In other studies, buffer additives (most often SDS) were used, enabling fast separations of metallic nanoparticles by size. Other CE methods also allowed for separation of nanoparticle conjugates with biomolecules. Dielectrophoresis is yet another electrophoretic technique useful in separation and characterisation of nanoparticles; particularly nanotubes. Detection methods often used after electrophoretic separation include UV/Vis absorption and fluorescence spectroscopy. Examples of recent and relevant older reports are presented here. The authors conclude that electrophoretic methods for nanoanalysis can provide inexpensive and efficient tools for quality assurance and safety control; and as a consequence, they can augment transfer of nanotechnologies from research to industry. © 2009 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim.