



Nanoparticle Detection and Measurement in Consumer Products



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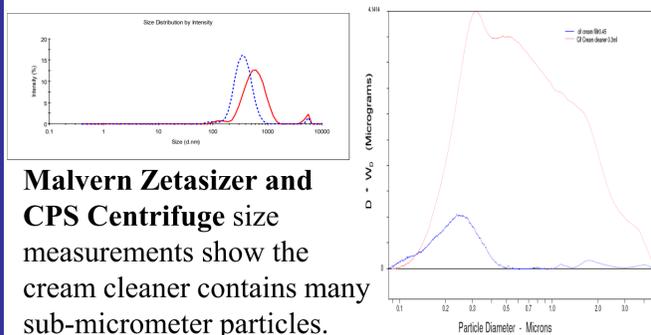
Introduction

Within the nanotechnology field, the risk and safety of nanoparticles (NPs) has become a topic of increased interest worldwide and a large volume of research and regulatory work has been carried on this subject during the last four years. While most of the research work is focused on the effects on health and the environment of engineered NPs such as carbon black, titania, carbon nanotubes, *etc.*... a close investigation of three of the popular consumer products such as household cleaning products and cosmetics has also shown that they contain NPs.

Methods

Three techniques have been employed to detect and measure NPs in consumer products: two are based on light scattering and absorption (Malvern Zetasizer, CPS Centrifuge) and one on high resolution transmission electron microscope (HRTEM) and energy-dispersive X-ray spectroscopy (EDX).

Cream Cleaner

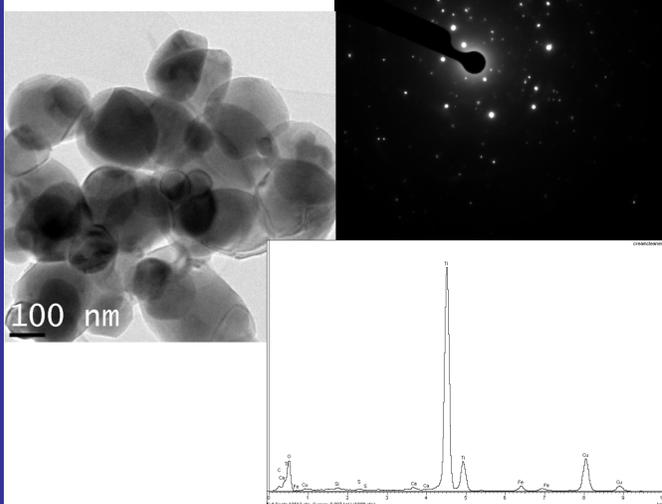


Malvern Zetasizer and CPS Centrifuge size measurements show the cream cleaner contains many sub-micrometer particles.

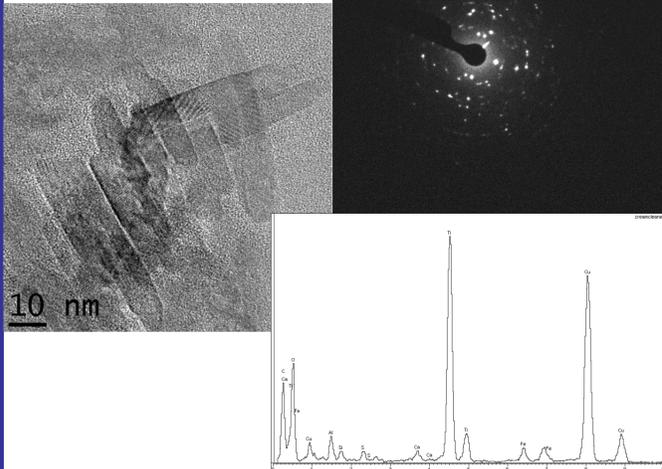
Red line –diluted product, Blue line - diluted product filtered through a 0.45 micron filter

HRTEM Picture, Diffraction Pattern and EDX Spectra Show:

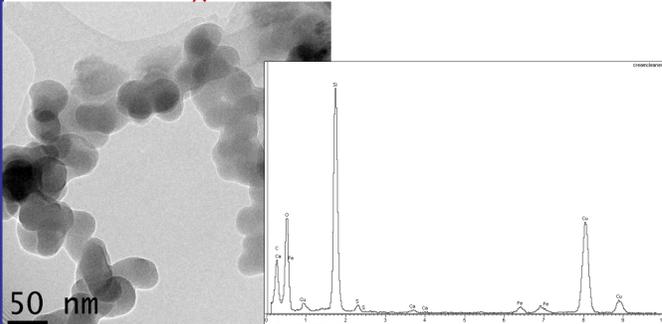
Spherical NPs containing Titania



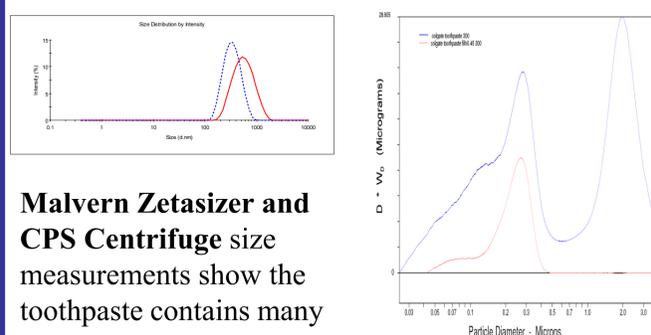
Rod shaped NPs containing Titanium and Calcium



NPs containing Silicon



Toothpaste

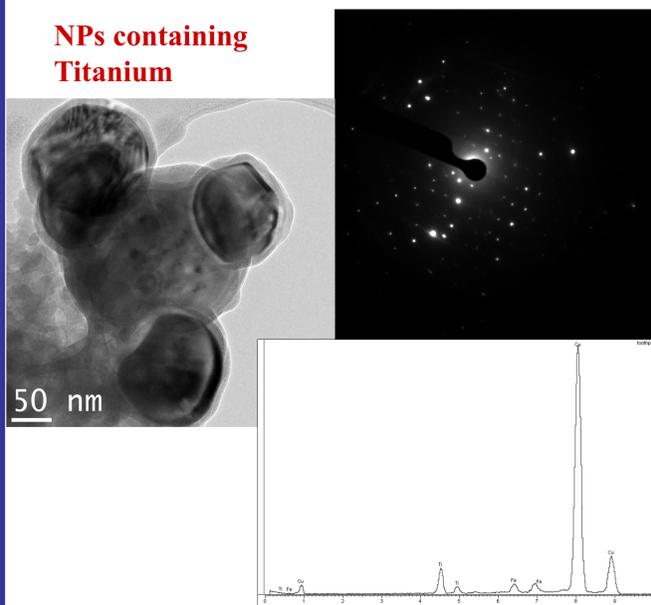


Malvern Zetasizer and CPS Centrifuge size measurements show the toothpaste contains many sub-micrometer particles.

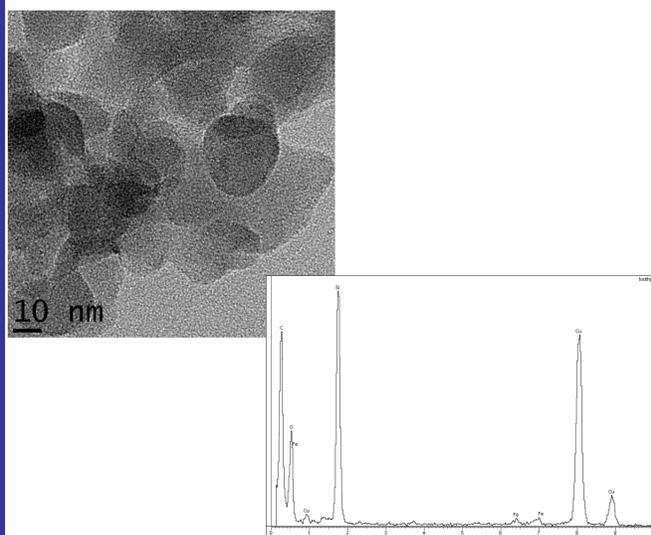
Red line –diluted product, Blue line - diluted product filtered through a 0.45 micron filter

HRTEM Picture, Diffraction pattern and EDX Spectra Show:

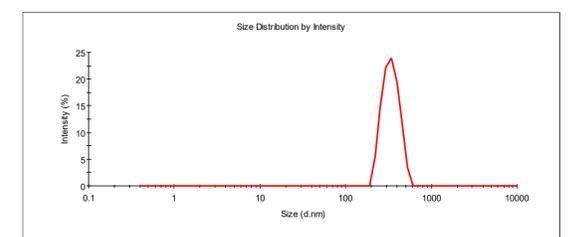
NPs containing Titanium



NPs containing Silica



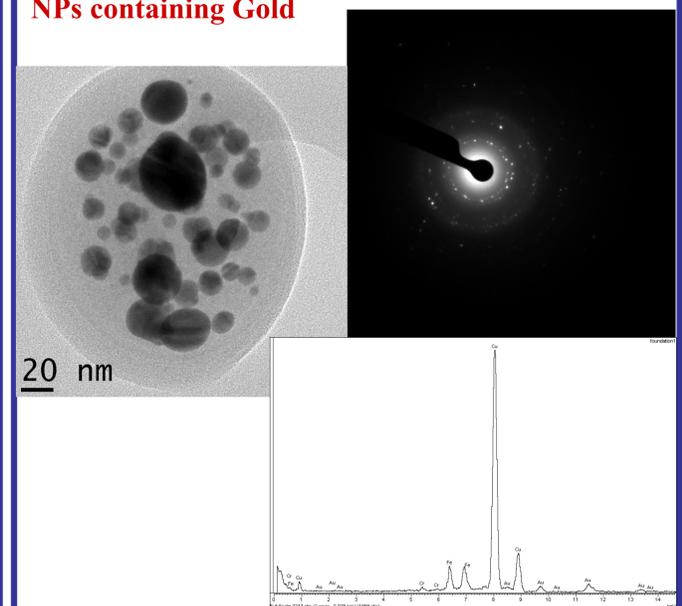
Foundation



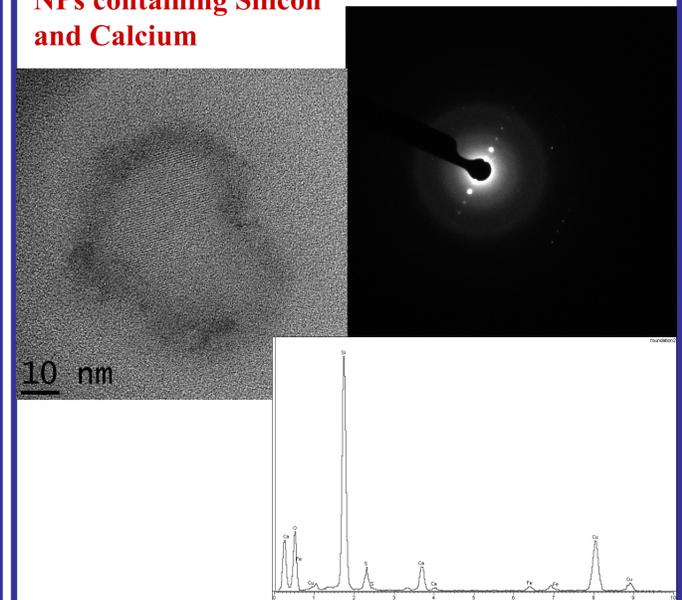
Malvern Zetasizer size measurements show the filtered (0.45 micron filter) foundation contains sub-micrometer particles.

HRTEM Picture, Diffraction pattern and EDX Spectra Show:

NPs containing Gold



NPs containing Silicon and Calcium



Conclusions:

The tested consumer products contain NPs and this study aims to raise the general public awareness of their ubiquitous presence. The investigated techniques proved useful and relatively easy to use for the detection and measurement of NPs in liquid consumer products.