

## Media release

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### **A milestone in nanoparticle research**

## **Nanoparticle Test Handbook sets the standards**

**A new handbook has been published under Empa leadership which aims to unify European standards in nanoparticle research. It contains detailed regulations for the manufacture and analysis of specific nanoparticles in the laboratory environment, placing research work in this field on a unified foundation and enabling valid comparisons to be made between studies. The editor, Prof. Harald Krug, is head of Empa's «Materials meet Life» Department.**

The new standard work is intended to bring to an end to the confusing mishmash of jargon which currently prevails in the nanoresearch field. This, at any rate, is Harald Krug's assessment of the situation. Krug is a member of the Empa Board of Directors and a nanoparticle specialist. In the past few years the number of publications on nanotoxicology has increased dramatically, from 150 scientific papers in 2004 to 1800 last year. And yet Krug has determined that, in describing the material being studied, every author defines things in their own way. "To date only the names of the substances being investigated are reported, such as zinc oxide," Krug criticizes. "But in what form do the nanoparticles occur? Are they spheres? Cylinders? Or ultrafine needles? Does the material contained traces of catalysts in addition to zinc oxide? Has it been given a coating to stabilize its surface?" In many publications all these questions and more remain unanswered, which means that the results of the research work are not comparable with other studies – and therefore of no value.

### **Exact regulations – with an update method**

The new fundamental reference work, named the «Quality Handbook» and subtitled «Standard Procedures for Nanoparticle Testing», is intended to provide a common scientific basis for European research projects in the nanomaterials field. The document was put together by the «Nanommune» consortium, a group of European and US research institutes, and financed by the European commission under the aegis of the 7<sup>th</sup> Framework Program. As editor of the handbook, Harald Krug was responsible for drawing the results of all his colleagues' work together. The handbook contains over 80 so-called SOP's (Standard Operating Procedures). With the help of these instructions nanoparticles with defined properties can be synthesized in

the laboratory. The SOPs also contain standardized analytical methods which can be used to characterize the physical and chemical properties of the particles as well as their biological effects.

Science never stands still, so a static book of regulations would have a very short period of usefulness before its contents became outdated. For this reason, the authors have made provision for future revisions of the new work even before its publication. "In a follow-on project (DaNa; [www.nanopartikel.info](http://www.nanopartikel.info)) a special SOP form is being prepared which will be used to provide feedback to the authors on improvements to the standardized methods," explains Krug. These improvements will then be integrated into future editions of the Quality Handbook.

### **Are nanoparticles dangerous?**

The Nanommune research project, which lasted for three years, dealt with the toxicological characterization of industrially produced nanoparticles – which are to a certain extent "designed" – as opposed to naturally occurring nanoparticles such as fine dust. These synthetic nanoparticles have enormous potential to aid industrial growth and to making a significant contribution to enhancing the quality of life of billions of people. However, the risks involved in the use of nanoparticles have to date not been fully investigated. Nanoparticles are over 100 times smaller than a cell and therefore possibly not recognized by the human immune system. Where they accumulate, what paths they take through the body and what effects they have are all questions which are currently under study. There is no reason to panic, according to Krug, for although industrially produced nanoparticles have been used for several decades already, they are not known to have caused any detrimental health effects.

### **Download-Link**

«Quality-Handbook – Standard Procedures for Nanoparticle Testing» can be downloaded from here:

<http://www.nanosafetycluster.eu/news/51/15/Quality-Handbook.html>

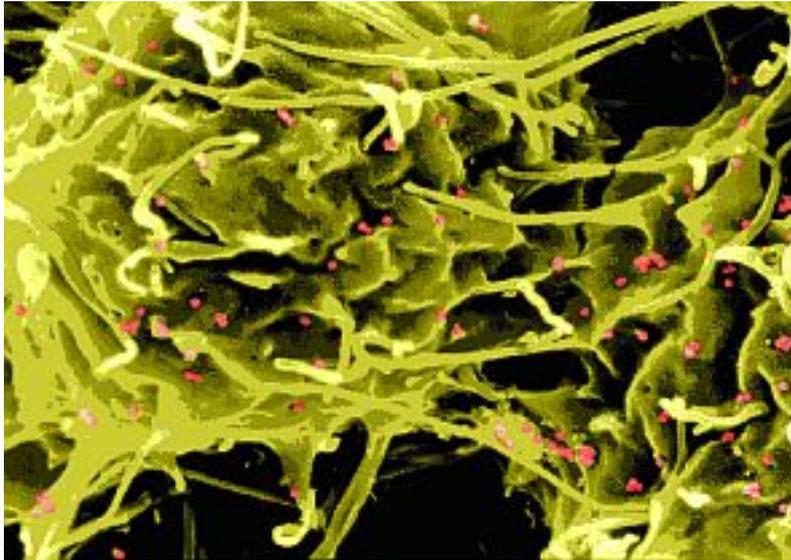
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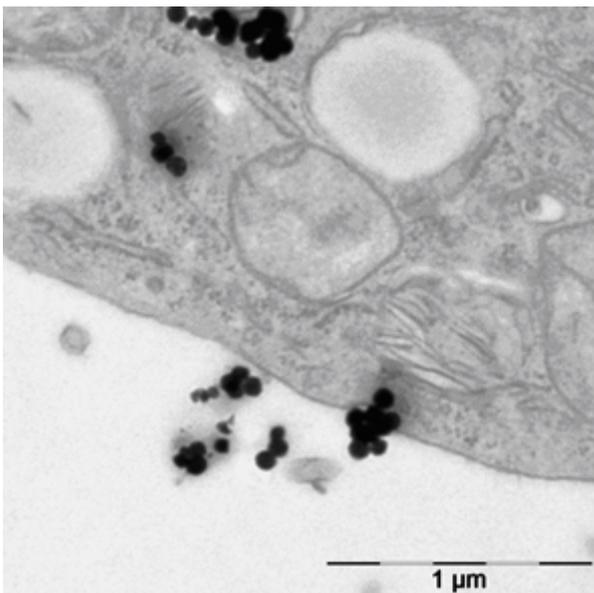
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Human macrophage exposed to hematite nanoparticles (70 nm). Scanning electron micrograph



Human lung cells (A549) exposed to hematite nanoparticles (70 nm). Transmission electron micrograph



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SEVENTH FRAMEWORK PROGRAMME  
THEME 4 - NMP – NANOSCIENCES, NANOTECHNOLOGIES,  
MATERIALS, AND NEW PRODUCTION TECHNOLOGIES (214281)

NANOMMUNE

COMPREHENSIVE ASSESSMENT OF HAZARDOUS EFFECTS  
OF ENGINEERED NANOMATERIALS ON THE IMMUNE SYSTEM

**QUALITY HANDBOOK**  
**STANDARD PROCEDURES FOR NANOPARTICLE TESTING**

[WORK PACKAGES NO. 2,3,4,5,6]

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NANOMMUNE DELIVERABLE XYZ

Title page of the Quality Handbook.

Text and images in electronic form are available at: [redaktion@empa.ch](mailto:redaktion@empa.ch)