

Tuesday, August 8. 2006

The ethics and politics of nanotechnology

UNESCO has published a report that assesses the ethical, legal and political aspects of nanotechnology. It attempts to separate the realistic potential of nanotechnology from some of the more fanciful headline-grabbing claims. It outlines what the science of nanotechnology is, and presents some of the issues facing the international community in the near future. Chapters cover the current status of nanotechnology and where nanotechnology will intersect with existing policy issues and ethical dilemmas. It assesses the top ten applications of nanotechnology and lists their relationship to the UN Millennium Development Goals (MDGs). The report says that the most pressing current issues are toxicity and exposure to humans and the environment. This produces ethical issues due to the new forms of hazard or exposure risks, which create new questions about how to deal with them. Current means of risk assessment do "not address any wider issues of the ethical or political meaning of this risk — such as who will bear it, how it will be distributed internationally, and who will be given the power to make decisions based on these analyses." It covers measures in the EU and the USA to deal with safety aspects and lists the twelve recommendations from from the European Commission’s Consumer Protectorate Directive. Under ethical issues, the report highlights the potential use and abuse of scientific information by governments and organisations. It sees the over-liberal granting of patents as a current problem "which can curtail even the most innocuous basic research by introducing prohibitive costs". In particular, it warns about business-method patents, which are "a good example of overzealous expansionism in intellectual property". These patents give broad rights to corporations that convert established processes into computerised processes — such as online auctions and online shopping. A short section covers "ethical issues that aren't" such as the "grey goo" scare of recent years. The report urges policy-makers, elected and appointed officials, non-governmental and advocacy organizations to look beyond these distractions and concentrate on the most pressing issues, which include potential hazards, consumer awareness, product regulation, intellectual property, secrecy, the reliability and legitimacy of international scientific research, and, most importantly, the promotion of uses for nanotechnology that help solve the most pressing needs for the greatest number of people. The report can be downloaded (as a PDF file) from: [REPORT](#)
Source: MTB Europe

Posted by Nano News at 10:04

Monday, August 7, 2006

Slaying myth about unsafe 'grey goo' nanotechnology

Nanotechnology is developing at an astonishing rate, with an increasing number of products coming to market that take advantage of modified material properties. Nevertheless, concerns persist over the risks associated with nanotechnology. For many journalists in the popular press and, therefore, members of the public, the main threat comes from self-replicating biological nanomachines widely referred to as 'grey goo'. Eric Drexler, who has been called the 'father of nanotechnology', first wrote about grey goo in his book *Engines of Creation*, published in 1986, though Richard Freyman pointed out as early as 1959 that nanometre-scale machines could be built and operated. Drexler wrote that, with the precision inherent in molecular construction, it would be easy to build multiple identical copies, which raises the possibility of exponential manufacturing, in which production systems could rapidly increase their productive capacity and, ultimately, lead to destructive runaway self-replication. In June 2004, however, Drexler, together with Chris Phoenix, published a paper¹ that largely dismissed the threat posed by grey goo. This paper explains that self-replicating machines are still possible, but not with current technology. Moreover, self-replicating machines are denounced as unnecessary, requiring additional complexity and cost compared with more efficient nanofactories that can produce nanodevices using production line principles (Fig.1). The authors therefore state that the construction of anything resembling a dangerous self-replicating nanomachine can and should be prohibited (though prohibition cannot prevent development by determined, unscrupulous individuals, organisations or states). However, having slayed the grey goo myth, Phoenix and Drexler go on to draw attention to other areas of concern. In particular, a convenient manufacturing capacity could be used to make powerful -- albeit non-replicating -- weapons in vast quantities, leading to an arms race, war, terrorism or oppression. Although such manufacturing equipment could potentially be compact due to the nature of the raw materials and the products, a large number of such nanofactories would be required to produce macroscopic quantities; a single molecular fabricator working at one million cycles per second would take around one year to generate one nanogramme of product. Other potential problems relating to nanotechnology highlighted by Phoenix and Drexler include radical shifts in economic and political power, and aggregate environmental risks from novel products and large-scale production. Top-level concerns about nanotechnology have been raised at all levels. In the UK, the Prince of Wales has spoken about his fears, and the UK government was moved to commission a study in June 2003, the report of which was published at the end of July 2004. *Nanoscience and nanotechnologies: opportunities and uncertainties* was prepared by the Royal Society and the Royal Academy of Engineering and is available via a website created specifically for the study (www.nanotec.org.uk). This is probably one of the most thorough independent studies into nanotechnology and, most importantly for this fast-moving field, one of the most up-to-date. A substantial amount of the report covers the wide-ranging applications and benefits offered by nanotechnology, but it also looks in detail at the associated risks. While self-replicating grey goo has been the biggest fear for many people, the truth is that there are other more pressing concerns. For example, toxicologists have reported examples of particles being inhaled, absorbed into the blood and then being transported to the brain. Although no adverse reactions have been seen, it is possible that nanoparticles may be developed in the future that do have adverse effects. Similarly, nanoparticles are already being commonly used within sunscreen products and it is not yet known for certain whether these may be absorbed through the skin and go on to cause problems -- especially if the skin has been damaged, perhaps through sunburn or eczema. The fact is there are still some unknowns, and the opportunities and uncertainties report stresses that data needs to be collected over the long-term to enable the situation to be monitored. Inhalation and absorption through the skin are possible for nanoparticles and nanotubes that exist in a free form, and particular care needs to be taken in production environments where concentrations might be greater. And there is also a greater risk of explosion if dust clouds of combustible materials form, especially considering the larger ratio of surface area to volume, compared with bulk materials. Because of the additional risks to human health and the environment posed by materials when they are present as nanoparticles or nanotubes rather than in their bulk condition, one of the report's recommendations is that materials in these forms should be classified and treated differently. But it is expected that most applications for nanotechnology will make use of nanoparticles as coatings or fixed within bulk materials. When firmly attached in this way, nanoparticles and nanotubes clearly present a much reduced risk, though the report warns that the product's complete lifecycle, including disposal, needs to be considered carefully, especially in view of the unknown way in which nanoparticles and nanotubes will persist in the environment and bioaccumulate. Nanotechnology certainly offers huge benefits but with some unquantified and unknown risks, so the best approach seems to be to proceed with development and for researchers, manufacturers and regulators to take sensible measures to manage the risks. Source: Engineer Live!

Posted by Nano News at 16:01

Friday, August 4, 2006

Nanotechnology maker NanoHorizons to participate at Techtexsil

NanoHorizons announced that Dennis Schneider, Director of Marketing and Sales, will present "Nanotechnology Applications in Fibers and Fabrics" at this year's Techtexsil North America Symposium, on March 29th. The Techtexsil North America Symposium, in its fourth year, is an internationally recognized and attended trade show and symposium for the technical textiles and nonwovens industry. The event brings together the industry's leading companies for education, networking and business development. Schneider's company, NanoHorizons, recently launched its line of nanoscale-engineered SmartSilver permanent anti-odor/antimicrobial additives, offering a safe and cost-effective method to enhance fibers and fabrics in a manner compatible with existing manufacturing processes. SmartSilver-modified fibers can be used to create odor-resistant shoe linings, T-shirts, socks, gloves, carpets and more. Coating and solids applications of SmartSilver are available directly from NanoHorizons. Schneider's presentation at Techtexsil, "Nanotechnology Applications in Fibers and Fabrics" will address how nanotechnology is rapidly changing the nature and capability of fibers and fabrics for a wide range of applications. "Nano" has become perhaps the most misused prefix in common usage. A Google search for the term "nanotechnology" results in 47 million Web pages (compared to only 15 million Web pages for polyester, which was introduced in 1941). Only a very small percentage of these Web pages refer to materials which represent genuine applications of nanotechnology. "Real" nanotechnology applications entail the creation of engineered structures with features smaller than 100 nanometers (1nm = billionth of a meter). Like the term "nano," "antimicrobial" has become part of the common vernacular, particularly in the textile industry. Applications touting antimicrobial capabilities do not generally follow specific criteria for evaluation and quality assessment. Such criteria should include permanence, effect on fibers and fabrics, design limitations, manufacturability and cost. Schneider will address the latest technology developments in these areas, particularly with respect to fibers and fabrics. Techtexsil brings together highly-seasoned executives, designers and developers who bring a great deal of expertise to the table," said Dennis Schneider. "An in-depth explanation of nanotechnology and antimicrobial protection will assist them as they evaluate product development and introductions in the marketplace. The overuse and misuse of the terms 'nano' and 'antimicrobial' makes it difficult for lay-persons to distinguish real applications of each." NanoHorizons Inc focuses on nanotechnology applications in the fiber and textile, healthcare and microelectronics industries. The company's research and development team addresses real-world problems with applied nanoscale engineering. Source: Fibre2fashion

Posted by Nano News at 14:50

Thursday, August 3, 2006

French Researchers Developing Key NanoArrayer(TM) Applications

BioForce Nanosciences, manufacturer of the NanoArrayer(TM) System for enabling new nanotechnology applications, has announced the placement of a NanoArrayer in Paris at the Universite Pierre & Marie Curie (UPMC) for technology evaluation by CNRS (Centre National de la Recherche Scientifique), the French National Center for Scientific Research. The NanoArrayer was installed in May in the laboratory of Dr. Fatiha Nothias who noted, "Our plan is to use the unique printing capabilities of the NanoArrayer to pattern proteins associated with cell morphology establishment and migration." Dr Nothias said, "Our end goal is to determine the consequences of the interactions of neurons and glial cells with these patterned proteins." Other French research groups in the same institute have expressed interest in utilizing the NanoArrayer to study how cells sense their environment during the organization of the embryonic tissue. Michael Lynch, Product Manager for the NanoArrayer, assisted with the installation and training process. He noted that, "The NanoArrayer enables protein patterning in the significantly small dimensions required to study single cell growth and development important in Neuroscience, Cancer Biology, Stem Cell Research, Genetic Disease and more." Lynch added, "This installation also provided an opportunity to introduce NanoAndMore, our European distributor for the NanoArrayer product line, to these new and exciting markets." "This technology agreement partnership with UPMC and CNRS provides BioForce with valuable new market applications of the NanoArrayer," noted Kerry Frey, BioForce COO. "Our goal is continued growth into emerging new bionanotechnology markets in Europe and this placement, our second overseas this year, continues our progress." About BioForce Nanosciences, Inc. BioForce Nanosciences is a nanotechnology tools and applications Company, providing innovative and practical products that support the growth of the nanotechnology industry. The Company has spent more than a decade of invention, research and development on patented and patent-pending nanotechnology products. The core technology is the NanoArrayer(TM) Benchtop Molecular Printer, a portal to new opportunities in nanotechnology. The NanoArrayer opens the door to new and important applications in the biomedical and life sciences markets that lead to improved quality of life. BioForce continues to target inventions that further expand the reach of its proprietary technology and expand its robust patent, trademark and IP portfolio. BioForce Nanosciences, Inc., the Practical Nanotechnology(TM) company brings inventions to the marketplace that complement existing innovations, licensing and acquisitions. BioForce is a wholly owned subsidiary of BioForce Nanosciences Holdings, Inc.. For more information, visit <http://www.bioforcenano.com> or contact BioForce at info@bioforcenano.com or 515-233-8333. This news release contains forward-looking information that may be affected by certain risks and uncertainties, including those risks and uncertainties described in the company's most recent filings with the Securities and Exchange Commission. The company's actual results could differ materially from such forward-looking statements. We assume no duty to update these statements at any future date. Source: BioForce Nanosciences, Inc.

Posted by Nano News at 15:10

Wednesday, August 2, 2006

Recent developments in Saxes seminar

Seminar on the recent developments in small angle X-ray scattering (Saxes) analysis of proteins, nano-particles and nano-structures. Anton Paar, in conjunction with the chemistry department of the University of Bath, UK, will be hosting a seminar on the recent developments in small angle x-ray scattering analysis of proteins, nano-particles and nano-structures. The seminar will be held at the chemistry department of the university of Bath on Friday, 22 September 2006. The themes for discussion include aggregation of proteins, nano-structure analysis, DNA-lipid interactions and Nanoporous materials. The agenda includes viewing some of the latest technology available and registration for the seminar is free. Anton Paar, 13 Hardforde Court, John Tate Road, Hertford, SG13 7NW United Kingdom, Telephone: +44 1992 514730. Source: Laboratorytalk

Posted by Nano News at 10:56

Tuesday, August 1. 2006

Nanotechnology passes first toxicity hurdle

Scientists in Mexico have found a way to reduce the toxicity of carbon nanotubes, paving the way for the use of the technology in food packaging. Nanotechnology has been touted as the next revolution in many industries, including food manufacturing, where there may be applications to improve food quality and produce pathogen resistant packaging. However, carbon nanotubes (CNT), the basis for nanotechnology, have been found to be toxic in certain applications. There has been no long term study on the impact of CNTs on human health. Concerns that the use of nanotechnology in food packaging products could harm consumers has spurred scientists from the Advanced Materials Department at IPICYT in Mexico to develop a way to reduce the toxicity of CNTs. Manufacturers and scientists are concerned that CNTs could affect human health by infiltrating the body through contact with the skin or by ingestion or inhalation of commercial products. Professor Mauricio Terrones headed the team that discovered that doping CNTs with nitrogen reduced the risk of death or severe respiratory reactions to CNTs in mice. The research found that CNTs did not harm mice when directly inhaled or ingested. However, pure CNTs administered to a mouse's trachea caused death while nitrogen doped CNTs produced an acute respiratory inflammation. "Because none of our studies with nitrogen-doped CNTs resulted in the death of the mice, we believe that nitrogen-doped CNTs would be more biocompatible when compared to other types of CNTs," said Terrones. "We need to carry out a lot more research but have very encouraging results." The research will come as promising first step toward the full-scale introduction of nanotechnology in processing and manufacturing. Nanotechnology has become a hotly debated consumer issue due to fears over the unknown consequences of digesting CNTs that are designed to behave in a specific way in the body. Earlier this month, consumer pressure led the UK Council for Science and Technology to review the government's nanotech safety policies. Even the EU is busy creating a standardized system for assessing nanotechnology toxicity. The Registration, Evaluation and Authorization of Chemicals (REACH), when passed, will hold businesses responsible for chemical safety and addresses the creation of a standardized test for assessing the toxicity of nonmaterial. Source: FoodProductionDaily - USA

Posted by Nano News at 14:10