



2009 PUBLIC DEBATE

Development
and regulation
of
NANO
technologies



MINISTRY FOR ECOLOGY, ENERGY, SUSTAINABLE DEVELOPMENT AND THE SEA • MINISTRY FOR THE ECONOMY, INDUSTRY AND EMPLOYMENT • MINISTRY FOR LABOUR, LABOUR RELATIONS, THE FAMILY, SOLIDARITY AND URBAN AFFAIRS • MINISTRY FOR HIGHER EDUCATION AND RESEARCH • MINISTRY OF DEFENCE • MINISTRY FOR HEALTH AND SPORT • MINISTRY FOR FOOD, AGRICULTURE AND FISHERIES

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In what products and sectors are nanotechnologies and nanomaterials already present? What new possibilities will they open up in the future?

According to a recent inventory, 800 products present on the market incorporate the result of nanotechnology research. Today, none of them are entirely made up of nanomaterials, but many contain a small quantity that is enough to alter its

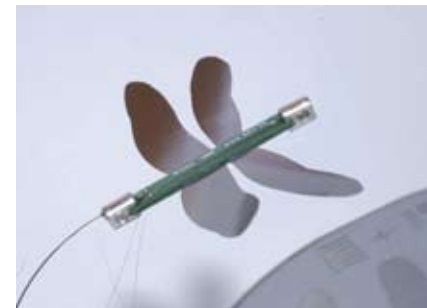
properties. In the areas of pollution clean-up (water and soils) and of drinking water, nanoparticles are used because of their high reactivity. In the healthcare field, nanotechnologies are leading to progress in prevention (vaccines), diagnosis (nuclear magnetic resonance imaging, marker analysis), and treatment. Therapeutic strategies are being developed that use the

transfer of drugs by nanovectors directly to the areas to be treated, especially in the fight against cancer.

In the fields of electronics and information and communication technology, they make for more rapid access to information and for increased processing power and data storage capacity. There are also applications for national defence and internal security (night vision systems, acquisition and processing of data on objects and individuals, etc). Nanotechnologies can help to strengthen the protection of soldiers (biological and chemical detectors, protective and self-repairing fabrics, etc) and increase the efficacy of weapons systems.

In the food industry, available information indicates that, although nanoparticles are scarcely present in the food we consume (with the exception of silica nanoparticles that have been in use for several decades), such materials are already helping to improve the effectiveness of food packaging. (They could also increasingly find use in the future in food supplements and additives, as is already the case in some countries). Upstream, applications in farming (fertilizers) and animal husbandry (veterinary medicines) are under development.

Finally, many everyday consumer goods already incorporate nanomaterials, such as tyres (longer lifetimes), cosmetics (action against the effects of free radicals), varnishes and paints (anti-corrosion and micro-scratches), sports and leisure goods (lighter and tougher tennis rackets and bicycles), and fabrics (anti-crease, anti stain and anti-odour).



Hummingbird drones
Hummingbird drones illustrate the possibilities for miniaturisation opened up by nanotechnologies, for both civilian and military applications.

What measures should be envisaged? What supervision should be planned?

Today, the interest shown in nanotechnologies, whether in laboratories, in industry or by the general public and consumers, is a result both of the pressure of intense international competition and of the need to clear up uncertainty about the potential risks associated with the products and materials which stem from them.

The precautionary principle, which in France is a constitutional obligation, governs this debate just as much as the need for information, openness and dialogue with all the actors involved in this developing technology. The application of this principle should not be allowed to curb the pursuit of progress: on the contrary, it aims to enhance our understanding, clarify choices, control impacts and avoid harmful effects. The re-

search effort in this field, which is backed by the Government, is already moving in this direction.

Three priorities have emerged up until now: it is necessary to speed up the characterisation of nanometre-scale substances and specify how exposure to them occurs, how they spread and the effects this may have on the human organism and on the environment; inform the general public and involve them in prior debate about scientific and technical choices; and continuously adapt legislative and regulatory supervision as knowledge makes progress, incorporating recommendations that result from consultation with all stakeholders.

These three approaches should as far as possible be part of coordinated activity at international level, and should take into account action already carried out in various

countries, as well as by the European and international authorities.

The debate entered into with the general public aims to provide widespread factual information about nanotechnologies to enable as many people as possible to keep up with this rapidly developing field. It will provide information about the public's expectations about hoped-for benefits; their questions about the expected applications, their impacts and possible alternatives; and their concerns and needs for knowledge.

From a more technical point of view, the results of this debate should contribute to the work being carried out on standards (ISO, AFNOR) and the European REACH Regulation relating to chemical substances. They will also form a set of references for the pursuit of dialogue with all stakeholders, both in France and throughout the world.



Debate and decide: the need for good governance, a means of ensuring the participation and understanding of all.

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