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The Nanotechnology Consumer Products Inventory

Andrew Maynard, Chief Science Advisor, Project on Emerging Nanotechnologies
Evan Michelson, Research Associate, Project on Emerging Nanotechnologies

Project on
Emerging Nanotechnologies
at the Woodrow Wilson International Center for Scholars

The **Project on Emerging Nanotechnologies** is an initiative launched by the Wilson Center and The Pew Charitable Trusts in 2005. It is dedicated to helping business, government and the public anticipate and manage possible health and environmental implications of nanotechnology.

Web sites: www.nanotechproject.org ; www.wilsoncenter.org
Email: nano@wilsoncenter.org
Contact phone: 202-691-4282

Introduction

After more than twenty years of basic and applied research, nanotechnologies are gaining in commercial use. Nanoscale materials now are in electronic, cosmetics, automotive and medical products. But it has been difficult to find out how many "nano" consumer products are on the market and which merchandise could be called "nano."

This is the first publicly available on-line inventory of nanotechnology-based consumer products. The inventory is an essential resource for consumers, citizens, policymakers, and others who are interested in learning about how nanotechnology is entering the marketplace. It is meant to be international and expanding. Additions to the inventory will be made periodically, as new information is received.[1]

While not comprehensive, this inventory gives the public the best available look at the 200+ nanotechnology-based consumer products currently on the market. Prior to this inventory, the figure most often cited by the U.S. government was that approximately 80 consumer products using nanotechnology or containing nanomaterials were being sold.

Methodology

Beginning in 2005, the Project began compiling products and materials using or containing nanotechnology from around the globe for inclusion in the consumer inventory. Entry to the list is based primarily on online, English language information provided by the product manufacturers. It does not include nanotechnology consumer products which companies have not identified as such. Any statements, claims and views expressed by a manufacturer or third-party contained in this inventory are solely those of the party making the statement or claim.

The information contained within the inventory is solely based on information that can be readily found on the internet; non-internet based sources have not been used. By taking this approach, all entries can be validated by anyone with internet access.

Products have been identified for inclusion in the inventory following systematic web-based searches. These have ranged from exploratory searches, through searches on specific categories of goods, to following up leads from multiple sources (including media articles). Information from relevant listservs and Really Simple Syndication (RSS) feeds was also used.

Products in this inventory satisfy three criteria:

- They can be readily purchased by consumers, and
- They are identified as nano-based by the manufacturer OR another source, and
- The nano-based claims for the product appear reasonable.

In every instance, we have tried to identify specific products from specific producers. However, since nanotechnology has broad applications in a variety of fields, we have included a number of "generic" products that you can find in many places on the market such as computer processor chips (identified in the inventory by the Generic icon). In

[1] Users are encouraged to submit new and updated information to nano@wilsoncenter.org.

some cases, companies offer several similar nanotechnology-based products and product lines. To reduce redundancy, we have just included a few samples in this inventory and hope that they will provide an initial baseline for understanding how nanotechnology is being commercialized.

We have made no attempt to verify manufacturer claims about the use of nanotechnology in any products, nor have we conducted any independent testing of the products.

This is a dynamic inventory, and will be updated on a regular basis.

Summary

As of March 8, 2006, the nanotechnology consumer products inventory contained 212 products or product lines. For each entry, information is provided on:

- Product name
- Company, manufacturer or supplier
- Country of origin
- Category and subcategory
- Product picture
- Product description
- Hyperlink to product web page
- Date of update

Products are grouped according to eight main categories (Figure 1) that are loosely based on publicly available consumer product classification systems. These include:

- **Appliances** (Heating, cooling and air; large kitchen appliances; laundry and clothing care)
- **Automotive** (Exterior; maintenance and accessories)
- **Goods for Children** (Basics; toys and games)
- **Electronics and Computers** (Audio; cameras and film; computer hardware; display; mobile devices and communications; television; video)
- **Food and Beverage** (Cooking; food; storage; supplements)
- **Health and Fitness** (Clothing; cosmetics; filtration; personal care; sporting goods; sunscreen)
- **Home and Garden** (leaning; construction materials; home furnishings; luxury; paint)
- **Cross-Cutting** (Coatings)

As new products are entered, new categories and sub-categories will be added as needed.

Products by Category

The total number of products in the inventory is 212. Products with relevance to more than one category have been accounted for multiple times in Figure 1. The largest main category is *Health and Fitness*, with a total of 125 products. This includes products like cosmetics and sunscreens. Associated with each category are a number of appropriate sub-categories that allow for further organization of the products. For example, *Paint* is a sub-category under *Home and Garden*, while *Display* is a sub-category under *Electronics and Computers*. The *Cross-Cutting* category was included as a grouping of products that are multi-functional. Currently, the only sub-category under *Cross-Cutting* is *Coatings*.

In addition, 45 products have a *"generic"* designation, indicating that they are commercial technologies that will be used in, or are currently appearing in, a range of consumer products.

Figure 2 illustrates the sub-categories associated with the largest main category, *Health and Fitness*. It includes *Clothing* (34 products), *Sporting Goods* (33), *Cosmetics* (31), *Personal Care* (23), *Sunscreen* (8), and *Filtration* (6). Again, products with relevance to multiple categories have been accounted for multiple times. The *Clothing* sub-category is the largest in the inventory.

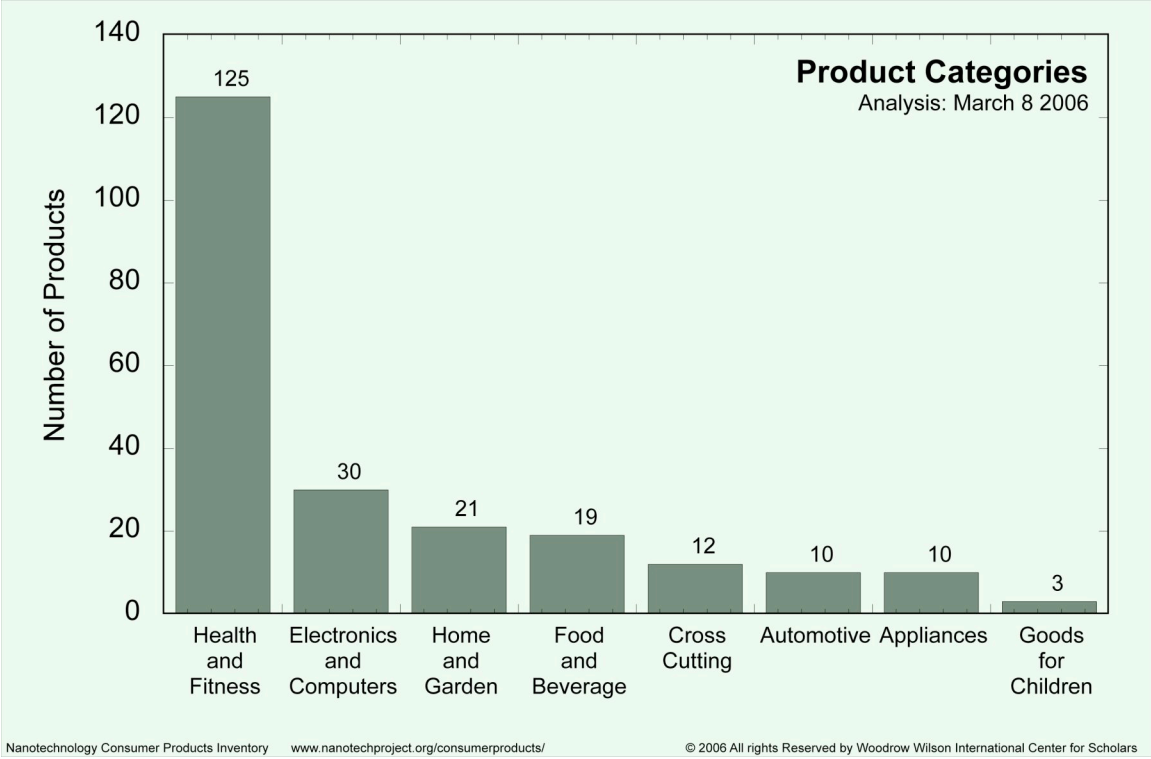

Figure 1. Number of products, according to category. Because some products are grouped into multiple categories, the total number of products in this chart exceeds 212.

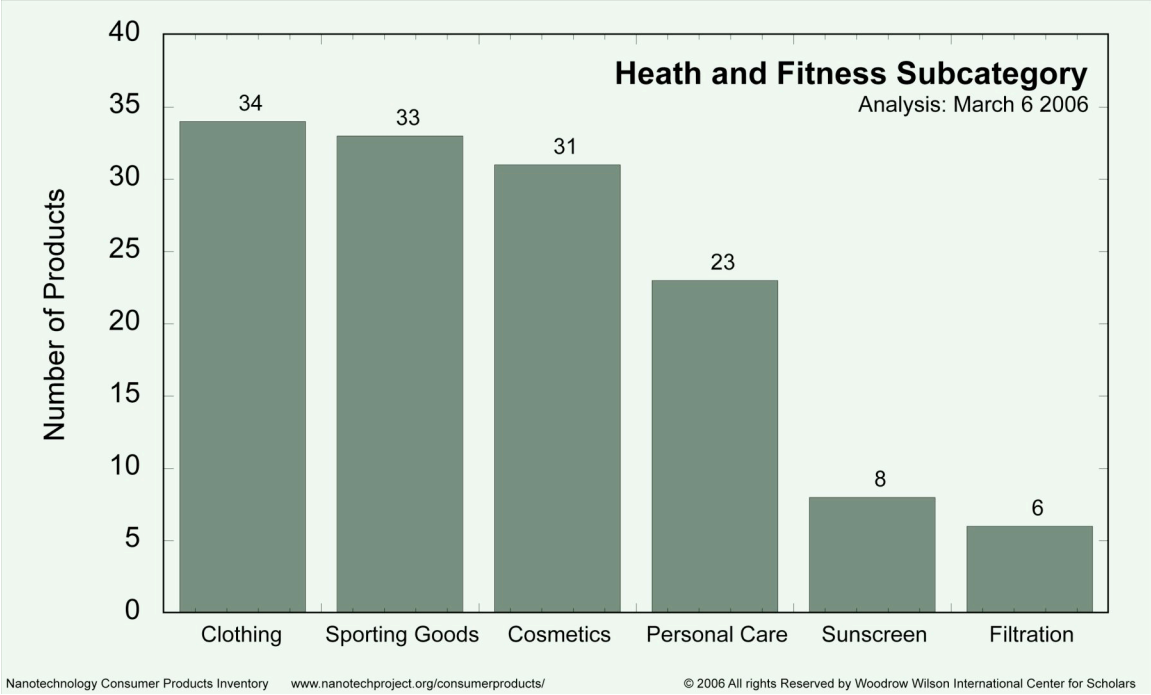

Figure 2. Number of products per sub-category within the category *Health and Fitness*

Regions of Origin

The inventory includes products from 15 different countries, including the United States, Korea, Japan, United Kingdom, Germany, France, China, Taiwan, Australia, Israel, Finland, Mexico, Switzerland, New Zealand and Sweden. Figure 3 illustrates the breakdown of products by region and indicates that companies based in the United States have the most products, with a total of 126, followed by companies in Asia (42), Europe (35), and elsewhere around the world (7). Two products have not been included in this figure because they are headquartered in multiple countries.

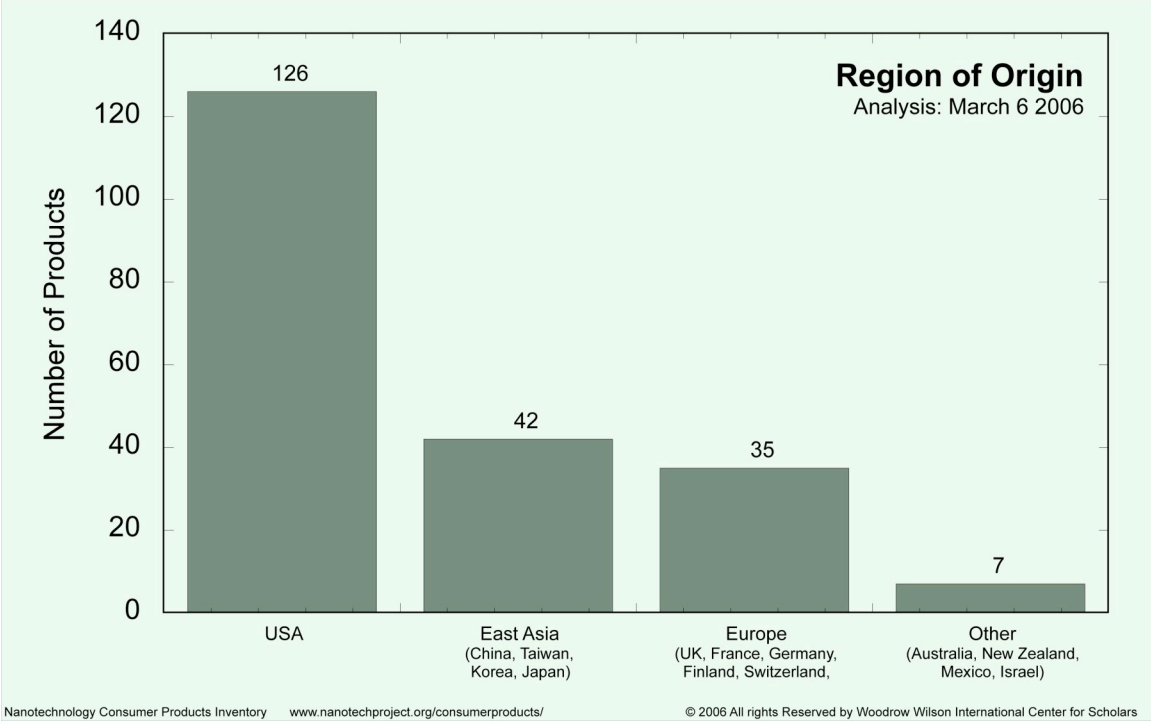

Figure 3. Number of products per region.

Major Types of Engineered Nanomaterials Used

As Figure 4 indicates, there is a small set of materials explicitly referenced in nanotechnology consumer products. The most common material mentioned in the product descriptions is carbon (29 products), which includes fullerenes and nanotubes. Silver is the second most referenced (25 products), followed by silica (14), titanium dioxide (8), zinc oxide (8), and cerium oxide (1). By our estimate, there are also a total of 15 products in the inventory, including food and dietary supplements, that are ingested into the body and a total of 56 products, including cosmetics, sunscreens, and select personal care products, that are applied directly on the skin.

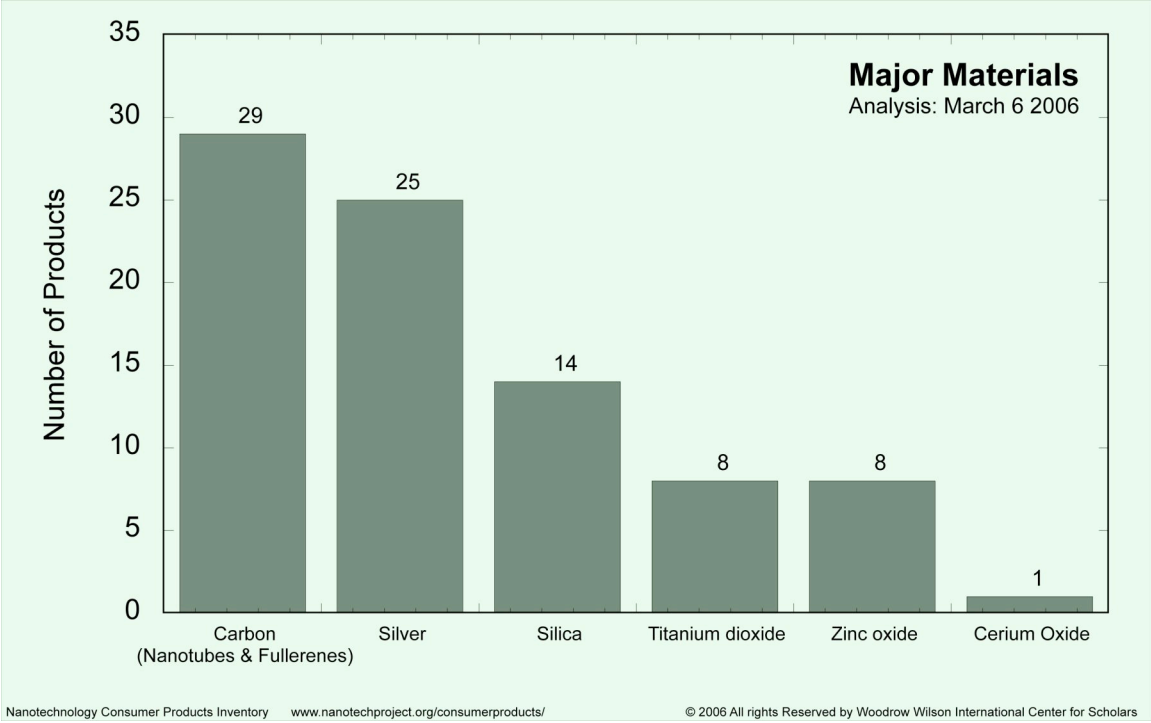

Figure 4. Numbers of products associated with specific materials.

Using the Inventory

Browse

All products in the inventory can be viewed by selecting "Browse". Ten products at a time are shown: use Next Page and Previous Page to move forward and backward through the inventory.

Simple Search

To carry out a simple search, enter a word or words in the search box, and select Search. All products are returned that contain the entered words as part of the product name, product description, category, sub-category, company name or country of origin.

Advanced Search

To carry out a more advanced search, select Advanced Search. This takes you to a page which allows you to search for specific key words within different fields (product name, category, sub-category, product description, company name or country of origin).

Further Information

Clicking on the product name in any list of products will take you to a summary page displaying more detailed information. Once on this page, clicking again on the product name will take you to the manufacturer's web site.

Home

Clicking on the inventory title or “home” link at any point will return to the inventory home page.

“Generic” Generic

These items aren't typically available directly as consumer products, but may be found in many different products.

Nanotechnology 101

Nanotechnology is the art and science of manipulating matter at the nanoscale (down to 1/100,000 the width of a human hair) to create new and unique materials and products. The opportunities to do things differently with nanotechnology have enormous potential to change society. An estimated global research and development investment of nearly $9 billion per year is anticipated to lead to new medical treatments and tools; more efficient energy production, storage and transmission; better access to clean water; more effective pollution reduction and prevention; and stronger, lighter materials. And these are just a few of the more significant ways in which people are discussing using the technology.

For more information on nanotechnology, check out the following websites:

Myths and realities of nanotech (BBC):
http://news.bbc.co.uk/1/hi/sci/tech/3920685.stm

Guide to Nanotech Future (BBC):
http://news.bbc.co.uk/1/shared/spl/hi/pop_ups/05/sci_nat_nanotechnology___building_the_future_from_the_bottom_up/html/1.stm

Big Picture on nanoscience (Wellcome Trust):
http://www.wellcome.ac.uk/node5954.html

Nanotechnology: Small science, big deal (Science Museum):
www.sciencemuseum.org.uk/antenna/nano/

Woodrow Wilson Center Project on Emerging Nanotechnologies:
www.nanotechproject.org

U.S. Nanotechnology Initiative:
www.nano.gov