

Nanotechnology in sports science and equipment in china

[Technology](#)



CAES 2802 essay Nanotechnology in sportsscienceand equipment in China

Have you ever wondered why the tennis racket you are using is so flexible yet durable to withstand the force of swings? Or why does that tight vest you are wearing seem so thin yet provide excellent protection and warmth even in the coldest weather? Nanotechnology has been a rapidly advancingtechnologyin the preceding decade, and is expected to be growing enormously in various aspects in the coming future.

The potential of nano-tech extends far, and gives promising results in sciences and medicine, and of course, the many sports equipment we are currently using. What is nano-tech? All matters are made up of tiny particles, called atoms, and their properties are directly determined by these small particles, their strength, colours, textures... Nanotechnology is a science which aims at directly making products in that atomic level, and therefore, we can directly decide what properties of that material we want.

For example, we want a light and strong material to make our sports rackets, and we found that carbon is the best building blocks and we invented many different kinds of materials, including carbon nanotube we always hear about. And these are collectively known as nanomaterial. Numerous researches have been conducted in both China and Hong Kong. China government has invested large amount of funds into the field of nano technology. Since 1999, China's spending on research and development (R; D) has gone up by more than 20% each year and a further funding of ? 12 billion has been invested in 20121.

And over 30, 863 patents on nano technology was established since 2008 and the number of nanotechnology related science publications in China has <https://assignbuster.com/nanotechnology-in-sports-science-and-equipment-in-china/>

ranked second in the world, surpassed only by the USA². These statistics all showed that China is closing gap between frontier countries and determined to have a large chunk of profit from this big cake. Back to the science itself, nanomaterial has been used on different sports equipment. For example, the tennis racket Roger Federer using is made with nano-titanium oxide, a very strong and light material, inside a matrix of carbon fiber composite³.

This makes their tennis racket extremely light and durable. What properties of nanomaterial constitute to these favourable characters? Most materials' properties are governed by how the atoms align themselves within the material, we call it the matrix. Normal materials will have dislocations among those aligned atoms and may result in weaknesses, however, nanomaterials have their atoms aligned in necklaces form and the boundaries between those "necklaces" becomes smaller and the material becomes stronger and, since spaces are conserved, lighter as well⁴.

Aside from this principle, scientists have also managed to place small particles within the matrix and making it more compact, for example, YONEX has succeeded in penetrating nano-scale particles between the carbon atoms, resulting in their rackets produced having 30% more strength and 10% more durability³. Despite these advantages, there are still risks of these nanomaterial having negative impacts to people's health and their safety is yet to be 100% confirmed to be free of harm.

Many countries have already passed legislations that regulate the uses of these nanomaterials. The Europe Commission has adopted a so called "incremental approach", which aims at using existing legislations to tackle with the problems of the possible risks of nanomaterial⁵. And after several <https://assignbuster.com/nanotechnology-in-sports-science-and-equipment-in-china/>

studies, the European Commission is considering the possibility of “reexamining and, if necessary lowering the current 1 ton per annum threshold” for engineered nanoparticles (European Commission, Health and Consumer Protection Directorate General, 2004).

Furthermore, the Royal Society and Royal Academy of Engineering has suggested that nanomaterials should be treated as a new substance under existing chemicals regulation laws, which state that those newly invented materials should be carefully assessed and classified⁵. The nanomaterial can be classified into the two types we have mentioned: materials that are nanostructured in bulk, and materials with nanoparticles within. It is the latter type of nanomaterial that is potentially hazardous to human beings.

The nano particles, which are not necessarily tightly bound to the material itself, will easily leak out and cause health impact to human beings. Also, many sports equipment, such as baseball bat contains carbon nanotubes and after disposal, may produce toxic gases with tiny carbon particles during waste treatment³. These are all possible ways of nanomaterial imposing harms to our health and should not be overlooked. Meanwhile in China, there is no legislation or regulatory means to assess those hazards from nanomaterial.

China has been urged to carry out extensive safety studies and tighten regulation of its thriving nanotechnology industry. Zhao Yuliang, deputy director of the Chinese Academy of Sciences’ National Centre for Nanoscience and Technology(NCNST), has stated that “ We certainly don’t want safety issues to become a trade barrier for nano-based products,” he said. “

The main challenge is to tease out what characteristics make some
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nanoparticles hazardous. " Although China is fast behind those science giants like USA, they still have much more to do before they can be praised as a scientifically advanced country.

Meanwhile the USA is spending half of its fund on nanotechnology for safety studies; China only spends a mere 3 percent. And most of the public is unconcerned about this matter, according to a survey conducted by Dalian University⁶. Nanotechnology is a marvelous science created by mankind, it has promised extensive uses in all kinds of field, and like all other technologies, it has its risks and danger. China, in the future, has much to catch up with, and should bear a more attentive and cautious attitude towards developing this kind of new material.

Especially when those products are so widely used in sports, where there are frequent contacts with human beings. Reference List 1. Tom M. China's giant step into nanotech. The Guardian [Internet]. 2009 [cited 2013 April 19]. Available from: " <http://www.guardian.co.uk/technology/2009/mar/26/nanotechnology-china>" 2. Can Huang, Yilin Wu. State-led Technological Development: A Case of China's Nanotechnology Development. EPIP 2011, Proceedings of The 6th Annual Conference of the EPIP Association, 2011. Brussels, Belgium: EPIP; p. -4 3. Chuyan Li, Xinliang Liu, Sijin Meng, Yanfen Xiao. " Study on application and biosafety of nano-materials in sports engineering". IEEE 2011. Proceedings of the 2011 IEEE International Conference on Future Computer Science and Education, 2011. Hong Kong, China: IEEE; p. 1-4 4. Brown University, NanoTechnology: New principle in material science discovered. ScienceDaily [Internet]. 2010 [cited

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