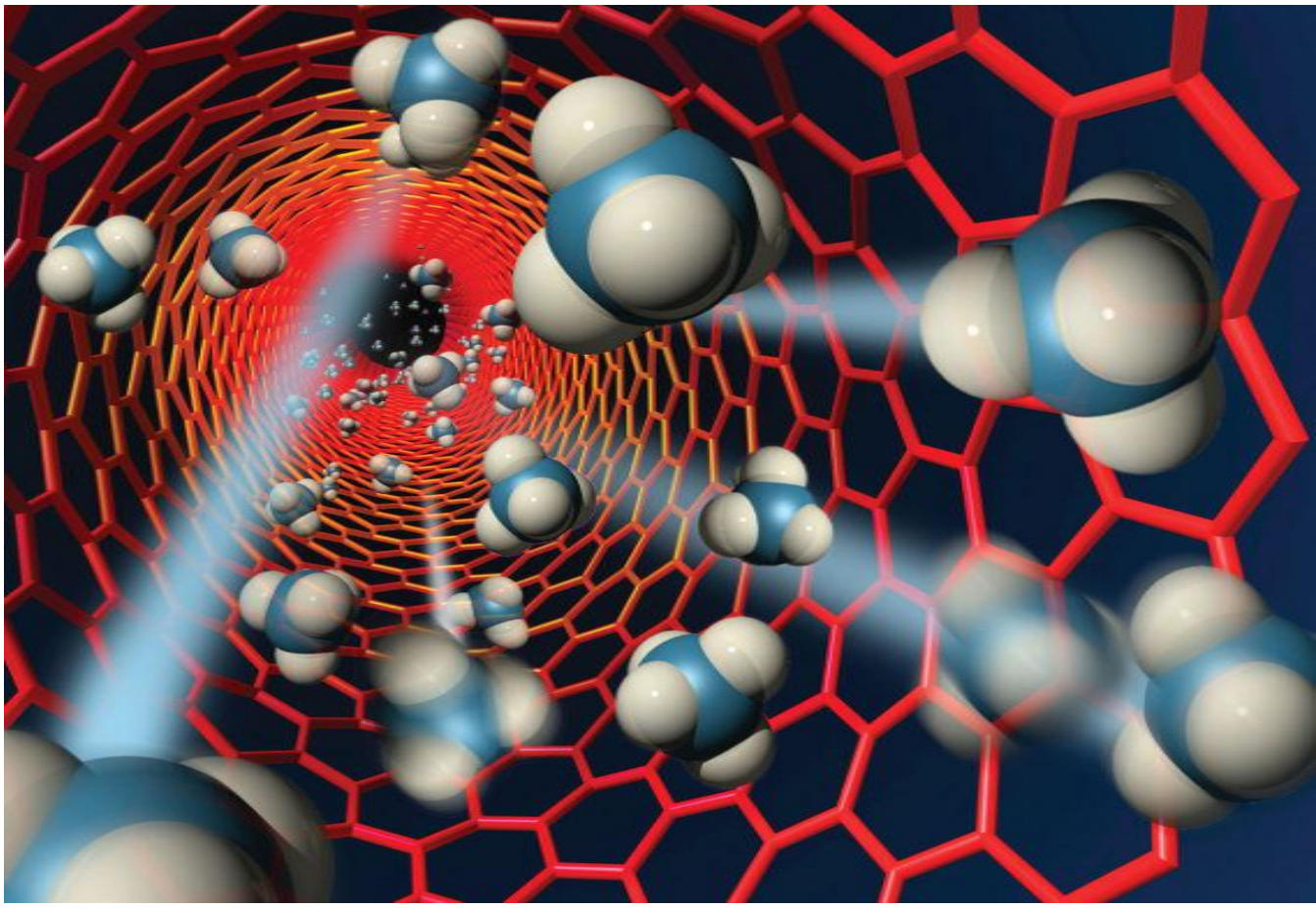
COGNEA RESEARCH

NANOTECHNOLOGY: THE BIG CHALLENGES OF THE SMALL



NANOTECHNOLOGY
THE BIG CHALLENGES OF THE SMALL

The science of nanotechnology has emerged since the early 1980s with discovery of fullerenes, one of the most widely used nanomaterials. Nanoparticles have found applicability in a diverse field of science viz. skin care products, drug delivery, solar cells, membrane filtration, tissue engineering, air filters, pharmaceuticals, MRI shielding etc. As exciting and versatile as the field looks, the more complex and intricate it is from the point of view of legal protection.

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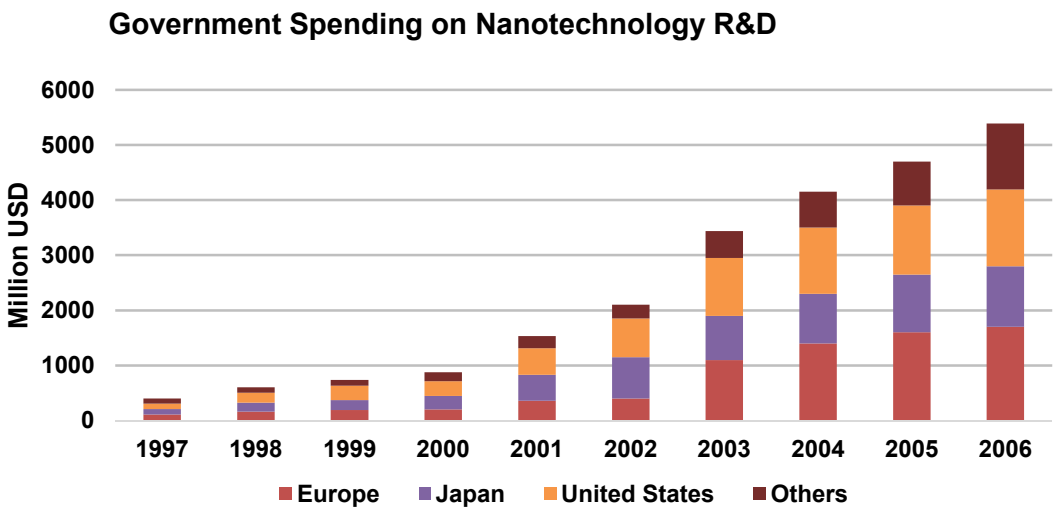
Nanoparticles are special because the properties of the structures at nanoscale are interesting and much different and than those existing at macroscopic level. The aspect ratio i.e., surface area to volume ratio in nanoparticles is much greater than that in bulk materials making it a fitting element for adsorption techniques. Zinc oxide nanoparticles used in sunscreens have improved protection against UVA and UVB radiations than the bulk substance. Other properties acquired due to nanoscale are surface Plasmon resonance and superparamagnetism.

The market for nanomaterials is projected to grow substantially over the years and revolutionize global markets. Technology market analysts have extrapolated data to predict the growth of nanotechnology products at compound annual growth rate (CAGR) of 11.1 percent from 2009 to 2015. The total market size of nanotechnology products could soar upto $1 trillion making it one of the fastest developing science fields of 21st century.

The world has begun to understand the commercial viability of investing in research and development focussed around nanotechnology. The total amount invested in nanotechnology around the whole world, by the year 2015 including government and corporate spending will nearly equal a quarter of a trillion dollars. In the year 2012, the United States ranked first in funding nanotechnology research activities by pledging a sum of $2 billion followed by China and EU at $1-1.3 billion.



DEFINING NANOMATERIALS

Most institutions around the world including the USPTO and EPO have accepted nanomaterials as structures having at least one dimension in the range of 1 – 100 nm. Having established the upper and lower limits of the dimension, can we be sure that all types of structures falling in the range be unambiguously identified as nanomaterials? More importantly, do all other particles less than 1 nm or greater than 100 nm not deserve to be called nanoparticles?

It is a well-known fact that large individual molecules have diameters in the range of nanometer. Although, some molecules such as fullerenes are considered as nanomaterials, most molecules are only large in size without exhibiting any characteristics whatsoever of a nanomaterial. Similarly, nanoclusters and nanoagglomerates maybe have sizes lesser than 1 nm. Such shall be characterized as nanoparticles if properties exhibited by them on nanoscale are significantly different from those on macroscopic scale. In the absence of such a phenomenon, they may or may not be included in the domain of nanoparticles depending upon whether or not they satisfy other related parameters.

NOVEL AND DIFFUSE NATURE OF NANOSCIENCE

With increase in investments, there has been a huge surge in nanotechnology applications over the last few years. The USPTO, EPO

and other PTOs around the world have tried to keep pace with the trend and maintained the competency of patent examiners in the relatively new field of science to successfully examine crucial nanotechnology patents. The time overspent by examiners without much technical expertise in the area might cost the patent applicant the loss of full potential value of the invention.

To add to the situation, nanotechnology being a novel field of science lacks considerably in prior arts. Also, since it derives its roots from multiple technology disciplines, tracking the whole range of prior arts associated with the invention becomes a difficult task. Hence, the granting of over-broad patent claims could have adverse impacts on further growth and innovation of the burgeoning nanotech industry.

INVENTION vs. DISCOVERY

The research and exploration activities in the field of nanomachines are evolved from the fruits of nature. Nanomachines are tiny machines built for the hope of heralding breakthroughs in the field of medical science solving the problems of incurable diseases such as terminal cancers and tumours. Complex proteins such as enzymes, cell organelles such as mitochondria, ribosomes etc. are a few naturally occurring nanomachines. In the field of gene technology, several naturally occurring genes have been discovered and identified.

The question that arises for patent examiners around the world is that should such breakthroughs be described as an invention or a discovery. The European Patent Convention addresses the challenges of patentability of an invention. When an innovation can only be described, it is a discovery. Although, if an unprecedented mechanism can be devised to isolate or synthesize such a substance, it could be called an invention.

In some cases, this rule has been overridden in the case of both newly-synthesized and naturally existing substances. Patents across the world have sometimes been granted if unusual properties of substances (not available previously in the public domain) have been established sans any inventiveness around synthesis or isolation of the substance.

Hence, patentability of a complex nano-entity would depend on complex factors which need to be comprehended and verified objectively taking care that patents are not awarded unnecessarily inhibiting further innovation and technology growth.

UNCERTAINTY IN PATENT PORTFOLIO VALUATION

As discussed before, nanotechnology patents can be of two types, namely application based patents and composition or structure based patents. It is easier to detect prior arts and litigate around application based patents than the latter type of patents. In order to detect infringement of a structure or composition based patent, experts need to carry out reverse engineering which not only requires skilled technical expertise but also highly complex and sophisticated, not to mention expensive equipments. Hence, only companies with sound financial statements will be able to invest in such patent portfolio while they can spend reasonably to detect who are using their invention in their products.

Even more pressing is the challenge of comparing patent portfolios in terms of returns on investment. Investors track the litigation and licensing history of a patent portfolio to evaluate the strength of a patent portfolio. As nanotechnology is a fledgling area of innovation, the litigation and licensing background of portfolios does not present a comprehensive enough data to decently valuate patent information and make right investment choices.

THE PROMISING NATURE OF NANOTECHNOLOGY

Nanotechnology presents a sea of challenges to the world while holding within, a plethora of potential to make the world more efficient. With our existence becoming increasingly technology-oriented, it only makes sense to incentivize those who are contributing to the technological evolution. Firms have taken a note of this and have created a stronghold of intellectual capital and an underpinning legal framework by investing in quality legal experts, taking utmost care in drafting patent claims and undertaking a rigorous and stringent prior arts search to minimize any possible damage in the future.

It has been rightly acknowledged that intellectual property is the only ticket to commercial success and investments can be made only on the basis of intellectual capital – its potential value and volatility.

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