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E-Spin Nanotech

One-stop Solution for Nanofiber
Technology and its Commercial
Product Development

The Man with The Invisible Thread

Dr. Sandip Patil,
Founder

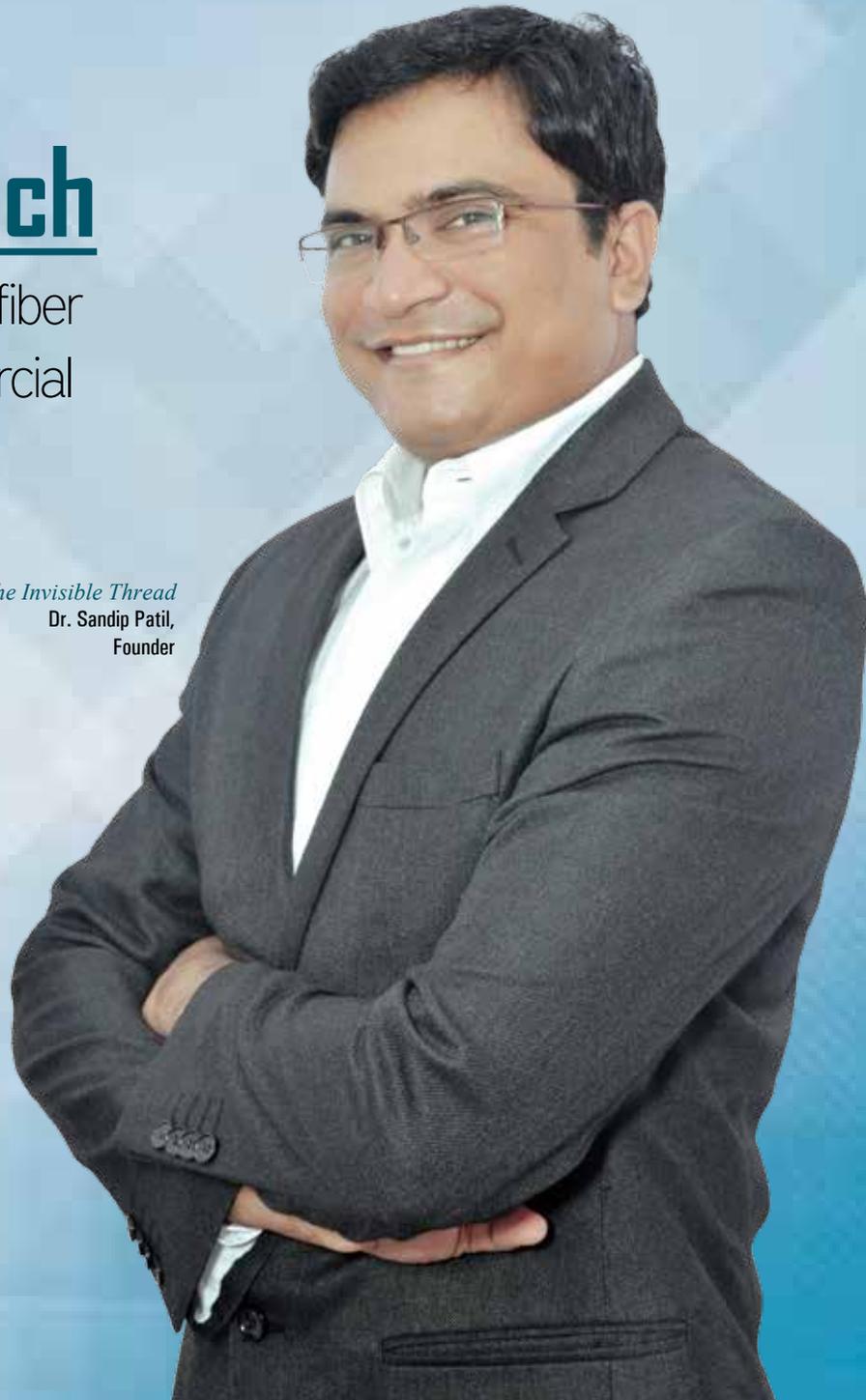
IN MY OPINION

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CEO INSIGHTS

Anant Gupta,
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E-Spin Nanotech Pvt. Ltd.:

One-stop Solution for Nanofiber Technology and its Commercial Product Development

By Nandini Mukherjee

IT Kanpur campus, 2008 – Sandip Patil was pursuing his Ph.D under Professor Ashutosh Sharma. Sandip had something different in his mind, something that could really benefit the Indian society. He was aware of the fact that how Indian money is being spent for the purchase of machines outside India, hence, he thought of working on an issue that is related to nanomaterial and nanostructures. The only hindrance to this was the development of nanomaterial in a single step. Initially, Sandip tried purchasing machines from Indian and non-Indian suppliers, but the cost was quite high. He then thought ‘why not develop the machine from the lab and for the lab?’ Within a time frame of six months, he developed a machine, named it Nanofiber Spinning Machine.

During this phase, he also silently observed the growing market for nanofiber and nanotechnology product development. He gave a thought to himself, ‘If our lab made machine works well then this could help IITs, NITs, DRDO, CSIR Labs and other institutions to affordably work on nanotechnology and nanofiber programs’. He endured a relevant market survey and developed the first prototype in 2009. Down the line, after a year or so he convinced himself and his mentor to start a business in the same space. Fortunate enough, Sandip got full support from Prof. Ashutosh Sharma, who not only encouraged him but also supported his decision to venture into the business space. His entrepreneur journey started on 24th November 2010 along with his wife Jagruti Patil, Director, E-Spin Nanotech Pvt. Ltd.

The real journey of entrepreneurship started at SIIC, Incubation centre IIT Kanpur. With the help of SIIC Incubation centre. In a city like Kanpur, Sandip had perceived that innovative ideas were not much welcomed, especially when it was a technology related business idea. But they say when you work hard towards your goal, you succeed. Sandip got his first order, even before his business being registered. It was in the same year, when Sandip designed the first lab scale prototype of nanofiber spinning equipment in cooperation with the IIT Kanpur and the first nanofiber spinning unit was installed. Following this success, another advanced nanofiber spinning machine (Super ES-2) was launched in the market later in 2012.

E-Spin Nanotech envisions being a leader in the area of quality manufacturing of nanofiber related products and equipments

Dr. Sandip Patil,
Founder



The Reusable Adhesive & Mediterranean House Gecko

Mother nature is full of surprises. We humans have always been exceptional when it comes to imitating the work of nature. Irrespective of flora and fauna, each species across the vertical has a unique characteristic that defines their existence. When we think of imitation, we express it in terms of technology. The Nanoscience or Nanotechnology is definitely the key here to bridge the gap between the advancements and technological breakthrough that's bound to happen across the globe.

Sandip's Ph.D. thesis was also a nature inspired one. The concept of Reusable Adhesive, which was purely influenced by the lizard – Mediterranean House Gecko. The lizard's ability to stick on the wall multiple times helped him conceptualize on the idea and work towards it. Moreover, he believed that nature also teaches us to reuse and recycle any material. Successful in creating first of its kind product, Sandip was instrumental in delivering promising results. Where the Reusable Adhesive application is priceless and can be used across industries.

But this was not what Sandip had envisioned. He wanted to develop a product based on nanotechnology that could offer affordable solutions in terms of energy, air and water filtration or anything that is affordable to the community. From lab level based spinning machine he began and simultaneously continued selling machines to sustain the business. Till date, Sandip and his team has delivered electro spinning machines across the world.

The machine as such by itself does not have an application but can produce the material that is used for various applications. The nanofibers created by the machine are simple & quick. The machine is primarily used to create nanofibers of various polymers. Using polymers, various applications and products can be developed. Sandip and his team have also begun to use nanofibers in airfiltration where the bacteria and viruses and other pollutants are removed.

Throwing light on their nanofibers filtration technology, Sandip speaks,

“We all have heard that the price of an air purifier is more than a water purifier. That is true. The technology that exists today is High Efficiency Particulate Air (HEPA) filter. HEPA filter is not very durable and it needs more energy to push the air through the filter. The air filter which we

The prime vision of E-Spin Nanotech is not only to develop research instruments for R&D purpose but also to provide knowledge based input to enable its customers to realise potential scope of products in diverse applications based on nanofiber technology

have developed does not require more energy. It has a very high flux; it removes bacteria, viruses and all sorts of materials which are present in the air, including carbon and suite particles. We are in a position to commercialize our technology within 6 months or so. We are also in talks with our industrial partners & MNCs to buy our products so that they can use it in their application”.

Team E-Spin Nanotech believes that there is an ever-growing need to bring innovative and state-of-the-art nanotechnology products and services in order to serve the society better as a whole and their clients in particular. Not only the company deals with nanofiber products and machine development, they also provide nanotechnology-based consultancy services. These consultancy services not only help them in supporting their client's organizational progress but also give an edge over the competitors. “We have innovated new techniques using high voltage spinning to make very fine fibers (~50 nanometre) by using various polymer melts. Further, we are in the process of developing nanofiber-based products in various areas such as energy, biotechnology, filtration and automobiles. All stakeholders, government, students and institute authorities, benefit from this. We provide the nanofibers and at the same time we also provide the continuous service support that motivates our client to keep working with us,” Sandip says.

Adding Impact in the Nanotechnology Space

E-Spin Nanotech's strength lies in their expertise through which they help the customers build new research domain and pursue their research interest. The company continuously communicates with the customer for the challenges involved in nanofiber research for further product development. They do customization



Nonofiber Spinning Machine

as per requirement at rationale cost and adopt two-way exchange of knowledge and service from their customers and reciprocate to their needs with the best efforts possible.

In the biomedical field, recently E-Spin has offered their services to one of the start-up Indian company, Oniosome Healthcare Pvt. Ltd. for developing nanofiber based ocular implants for glaucoma patients. This ocular

implant is capable of achieving controlled delivery of drugs for prolonged time span and thus avoids the need for repeated administration of eye drops which is often inconvenient and time consuming. Apart from this, biomedical implication of this product makes precise manufacturing and sterility to be of vital importance. Team E-Spin is providing services and helping Oniosome to develop commercial product to launch the ocular implants.

Similarly, the company is also engaged with Dr. Chandra Shekhar Sharma and his team at IIT Hyderabad for commercialization and development of feminine sanitary napkins to address the growing needs for cheaper and safer feminine hygiene management. The product is based on nanofiber technology developed by Dr. Chandra Shekhar Sharma's group at IIT Hyderabad which can achieve higher absorbancy than the contemporary products in the market without the usage of non-biodegradable super absorbant polymers with possible health hazards. This makes the sanitary napkins safe to be discarded without any environmental concerns, other than being user friendly. E-Spin will be constantly involved in providing scientific and technical support required to take this product to the market at reasonable cost.

An Edge above Others

E-Spin Nanotech is strongly committed to serve its customers not only with the products, but also draws scientific inputs from its customers and then engages its research force to meet their specific requirements on a timely basis. Such interaction with the industry and academia opens up good scope for collaboration with multidisciplinary research groups. The resulting valuable

E-Spin Nanotech – Products & Services

- Nanofiber spinning machine for lab research (single jet Electrospinning Model Super-ES1, Super-ES2, Super-ES3, and Super-ES4)
- Nanofiber spinning machine for industrial scale production (Multi-jet Electrospinning)
- Wet spinning machine for solid and hollow micro fiber fabrications
- Melt spinning for processing high-temperature polymers into nano to sub-micron fibers
- Nano-pours hollow fiber membranes for water filtration (waste water to Drinking water solution)
- Nanofiber based air purification filter (n-HEPA)
- Nanofiber based oil-water separation membranes technology

The Founder's Message – Dr. Sandip Patil

Sandip comes from an agriculture family background. Even till this day, his family is into farming and they reside in the agrarian region of, Pimpri (Chimthana) Dhule District, Maharashtra. Sandip believes that to achieve success, a person's background has got nothing to do with it. It's the ability to learn, adapt, and survive. His strong message to all the youngsters and budding entrepreneurs is that: "If you have something in mind, don't wait for someone to start it. Take initiatives. Analyze the pros and cons and go ahead. You'll be surprised to see how far your decisions can take you. Start today, then only you'll be able to enjoy the fruit of your labor and make a difference in the society."

outputs enable them to embark upon promising endeavours in product development. The prime vision of E-Spin Nanotech is not only to develop research instruments for R&D purpose but also to provide knowledge based input to enable its customers to realise potential scope of our/their products in diverse applications. "On this journey, we have involved in collaborative projects with several organizations including University of Wyoming (USA), IIT Hyderabad, NiNanoh Inc. (Kora), Audiance, Inc. (USA), IIT Kanpur and many more," he avers.

"Our strength is not only to manufacture the machine, but we are also experts in nanoscience and nanotechnology as we have graduated as Ph.D from premier research institutes of nation. Our expertise helps our customer to build a new research domain and pursue their research interest. We always stay in touch with the customer for challenges involved in nanofiber research for the further product development. This expertise and approach make us completely different than the other competitors," he further adds.

Over the years, as Sandip explains, E-Spin has tasted success in different phases. The company now has a well versed team of around 20

people that includes the R&D team headed by Dr. Sunil Dhole (Ph.D IIT Kanpur) and Dr. Uday Kumar (Ph.D. IIT Roorkee). The company has also won several awards and accolades, some of which are - TIME India Start-up Innovator for the year (2017) (One of top 3 Finalist), Top 5 Nano Technology Companies in India 2016 by SiliconIndia (2016), Spirit of Manufacturing Awards: Most Promising International Business Leader Award by TiE-Delhi(2015), Indian Leadership award for industrial development by All India Achievers Foundation (2014) and Intellectual Ventures Invention Award (2012).

The Future Growth Strategies

In the next three years, E-Spin Nanotech envisions being a leader in the area of quality manufacturing of nanofiber related products and equipments. In view of a lack of supportive environment for quality manufacturing in India, most of the potential customers prefer to buy these products and equipment from foreign suppliers. To overcome this problem, E-Spin Nanotech has indigenously developed a nanofiber manufacturing equipment with quality at par with foreign suppliers. The company is currently

in the phase of capacity build-up to increase production.

Additionally, to increase their credibility in the market, E-Spin is also in process of getting ISO standards, CE certification and NABL accreditation for their products. In coming years, the team has plans to add products to their portfolio, some of which include Manufacturing sector: Industrial nanofiber spinning machine (INR ~ 3 crores), Lab scale Nanofiber spinning machine (INR ~ 10 Lakh), Lab scale wet spinning machine with five end capacity (INR ~ 50 lakh), Industrial wet spinning machine. Bulk production (INR ~ 5 crore) and Lab bio printers (INR~10 Lakh). For Research and Development sector, E-Spin Nanotech is already working on projects with Indian and foreign R&D sector/ labs like University of Wyoming (USA), NiNanoh Inc. (Kora), Audiance, Inc. (USA), IIT Kanpur, IIT Guwahati, IIT Hyderabad, and NCBS Bangalore. The role of E-Spin in collaborations with these labs is to provide inputs in product development and also in manufacturing and commercialization of lab prototypes. Currently E-Spin is providing these institutes all help in manufacturing and commercialization activity.

Summarizing the journey, Sandip enthusiastically leaves a message for the readers wherein he correlates the Valley of death with industry and academics and/or customers and buyers. He mentions how buyers and customers always have in their mind the good things that are imported than what is indigenous. "Now the scenario is different. The mindset of people is completely different than it was previously. Today, we want to offer solutions to everyone in terms of quality and affordability. So, we are here to give the right solution. You can correlate out of this discussion," he concludes on a positive note. 