

Pioneering Scalable Self-Cleaning Textile Research. By *Kathlyn Swantko*

Let There Be Light!

The impact of self-cleaning clothes "is tremendous," according to Dr. Rajesh Ramanathan, a vice chancellor research fellow in material science at Royal Melbourne Institute of Technology (RMIT) University in Melbourne, Australia. "Our self-cleaning technology that utilizes a spot of sunshine is eco-friendly, and will save energy and water," he says.

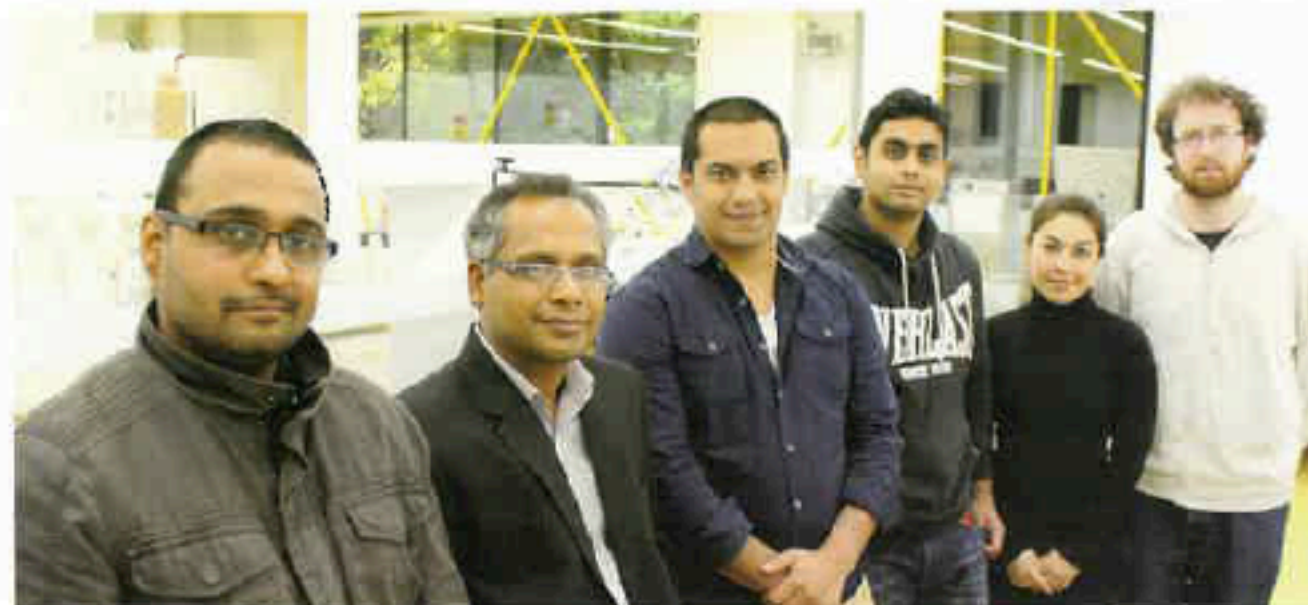
Ramanathan and his researchers have developed an inexpensive, efficient and scalable way to grow special nanostructures that can degrade organic matter when exposed to light. Their work paves the way towards nano-enhanced textiles that can spontaneously clean themselves of stains and grime, simply by being put under a light bulb or exposed to sunlight.

The research team began working on the project about four years ago under the direction of Dr. Ramanathan in the Ian Potter NanoBioSensing Facility and NanoBiotechnology Research Lab at RMIT. An important reason for selecting textiles as the research template was its light absorption ability. "Textiles have a 3D structure and are great at absorbing light, which is an essential component in our research," explains Ramanathan. "Using light as the stimuli speeds up the process of degrading organic matter."

How the Technology Works

RMIT's research involves the development of a process that is similar to the dyeing processes currently used by the textile industry. The team worked with copper- and silver-based nanostructures, which are known for their ability to absorb visible light. The team's approach was to grow the nanostructures directly onto the textiles by dipping the materials into several solutions, which resulted in the development of stable nanostructures within 30-45 minutes.

"During the process, as the nanostructures are exposed to light, they receive an energy boost that creates 'hot' electrons," cites Ramanathan. "These energetic 'hot electrons' release a burst of energy that enables the nanostructures



to degrade the organic matter."

The RMIT team's research disclosed that within less than six minutes, some of the nano-enhanced textiles spontaneously clean themselves. Because of the efficiency of the process, the team believes that it would be very easy for the textile industry to incorporate this method into their existing textile finishing process. The team is looking to extend its research toward a wider variety of fabric types, as well as to test the ability of the nanostructured textiles for degrading different kinds of stains. Self-cleaning clothes that only require the use of light will be an eco-friendly way to potentially change the consumers' dependence on energy and water for washing garments.

Ramanathan says, "Our current aim is to collaborate with a variety of industries to further advance our technology. We plan to test our nano-enhanced textiles with organic compounds that could be more relevant to consumers, to see how quickly the textiles can handle common stains like tomato sauce or wine. Since the process is relatively simple to implement, we believe that the technology should be an easy adaptation for many industries!"

RMIT's self-cleaning fabric team, from left: Dr. Rajesh Ramanathan, Prof. Vipul Bansal, Mr. Samuel Anderson, Mr. Dipesh Kumar, Ms. Mahsa Mohammadtaheri and Dr. Matthew Field.



RMIT University's research on self-cleaning textiles, contact Rajesh Ramanathan at rajesh.ramanathan@rmit.edu.au

Kathlyn Swantko, president of the FabricLink Network, created TheTechnicalCenter.com and FabricLink.com.

The FabricLink Network

How will they find you, if you're not there?

THE Networking / Education Search Engine for ALL Things Textile Related!

Why clients are excited about the benefits of The FabricLink Network

"Thank you for all the support you have provided to Concept III over the years. You know how much we value it. Keep up the good work!"

David Parkes
President
Concept III Textiles



Partnership Opportunities:

Kristi Rummel
kristi@rummelmedia.com
608.435.6220

Editorial Opportunities:

Kathy Swantko
kgswantko@fabriclink.com
818.345.7501

FabricLink

FabricLink.com

The
Technical
Center

TheTechnicalCenter.com