ASIAN INNOVATION AWARDS

'Nanoheat' finds uses in hospital, lab

Fast, energy-efficient material raises patients' body temperatures without interfering with medical equipment

By Andrew LaVallee

HONG KONG—For many medical patients, maintaining a normal body temperature is crucial to avoiding infections, blood loss and other complications.

But keeping patients warm, while they go through magnetic resonance imaging or are moved around a hospital, isn't easy.

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A company in Hong Kong has developed a technology, with the government's assistance, that aims to provide fast-acting, energy-efficient heating that is easily controlled as well as portable.

Advanced Materials Enterprises Co., an Asian Innovation Awards finalist, calls its technology "nanoheat," and one of its key products, the Nanoheat Profile Heater, is intended as thermal therapy for hospitals and other health-care facilities.

If patients' temperatures drop even a degree or two during surgery, it can slow their recovery and exacerbate some conditions, said Cheung Nim-kwan, chief executive of the Applied Science and Technology Research Institute, a Hong Kong-government-backed group that helped Advanced Materials flesh out the medical requirements.

"It's very important to keep them warm," he said.

Blankets don't work fast enough, and water-based heating devices don't provide enough precision. In addition, devices with heating coils or wires could interfere with medical equipment, Dr. Cheung said, making it critical that a product be able to work without such features.

"What we need to do is try to do the thing as quick as possible and also as comfortably as possible," said Wing Yiu Yeung, chief executive of Advanced Materials.

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Advanced Materials Enterprises developed an energy-efficient thermal technology. At left, the material is used in a hot plate. Above, Wing Yiu Yeung is the company's CEO.

"The body temperature is quite important to achieve a better recovery."

The profile heater Advanced Materials developed is a semicircular structure that patients lie under. It can be set to one temperature or several—it has multiple heating points that can be programmed individually if, for example, the patient needs higher heat on one side of the body. It heats up quickly—up to 5 degrees Celsius a second—and, importantly, runs on batteries as well as AC power, which makes it easy to move around and able to operate without interfering with MRIs and other medical equipment.

Dr. Yeung, who holds a Ph.D. in materials technology, started Advanced Materials in 2006 after 30 years in manufacturing and academia. The Hong Kong company has since expanded from two people to 16, about half of whom are engineers.

Advanced Materials worked with the Applied Science and Technology Research Institute, or Astri, to develop nanoheat, and received research-and-development funding from Hong Kong's Small Entrepreneur Research Assistance Program.

For Astri, which is working with some 100 companies this year, Advanced Materials represented an opportunity to explore biomedical engineering, a "relatively new" area for the 10-year-old organization, Dr. Cheung said. "We are very excited about the possibility of doing this kind of research in Hong Kong."

Advanced Materials is finalizing its commercial prototype and hopes to build its devices locally, Dr. Yeung said.

It has been in talks with hospitals since the early days of nanoheat's development.

Similarly marketed devices sell for as much as 7,000 Hong Kong dollars, or roughly $900, he said. "We can go even higher."

Dr. Yeung sees potential applications beyond the emergency room because some patients may still need a way to help regulate their body temperatures when they leave the hospital.

Advanced Materials plans to develop its own products but also license its technology, and it is in talks with other manufacturers looking to enhance their offerings with heating components, though Dr. Yeung declined to name them.

One device already on his radar is a flexible heater, potentially incorporated into clothing and marketed to consumers, which he aims to develop over the next two years.

"This will be quite a huge market," he said.

Nanoheat products with other applications, ranging from heated towel racks to laboratory hotplates, are in development.

The company's portfolio is focused on a suite of heating products, but "it doesn't mean we limit our business," he added. It is considering other industries, such as aerospace, for future materials-technology projects.