Ideas on the Edge

Getting a New Handle on Polymers

LAMBTON COLLEGE RESEARCHER KIM CHOO IS COMBINING RUBBER AND PLASTIC TO GET THE BEST OF BOTH—AND A RANGE OF NEW PRODUCTS.

The next time you're in the bathroom or the kitchen, take a closer look at your toothbrush, or at that stylish new ice-cream scoop. Chances are good that the handles will combine the smoothness of plastic with the "grippiness" of rubber.

Plastic and rubber are both composed of polymers—long chains of identical molecules—but the two substances have different structures and therefore different properties. Plastics—in particular the hard "thermoplastics" familiar to us in everything from toys to lawn chairs—can be easily melted and molded in a variety of shapes. It's a property that also makes these items relatively easy to recycle. Rubber, on the other hand, burns rather than melts and is therefore hard to recycle. But rubber is more flexible and resilient than plastic.

RESEARCH THAT MATTERS

REAL-WORLD BENEFITS FOR ONTARIANS:

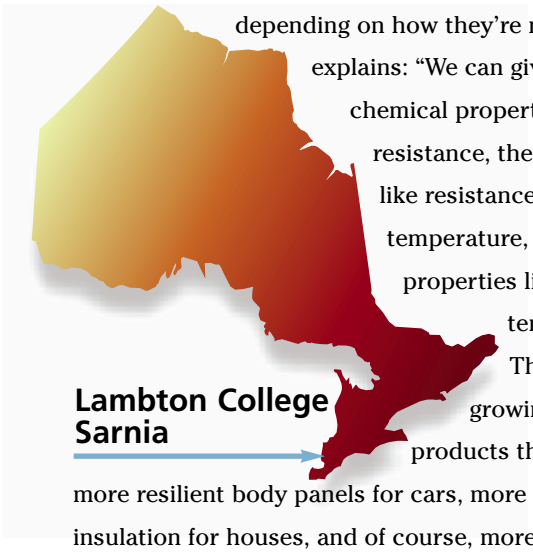
- wide range of innovative products
- development of advanced chemical and manufacturing technologies, leading to more competitive industries in the global marketplace

Now, however—as your toothbrush and ice-cream scoop may indicate—chemists have found a way to combine the best of both worlds.

"If you mix rubber with plastic," says Dr. Kim Choo, a researcher at Sarnia's Lambton College, "then all of a

Dr. Kim Choo (left) and lab technologist Alex Ip examine plastic produced by an extrusion machine at the Lambton College Centre of Excellence for Process Manufacturing.

sudden the characteristics are different." These new thermoplastic elastomers—"elastomer" refers to the flexible, rubbery quality—exhibit a range of characteristics, depending on how they're made. Dr. Choo explains: "We can give them special chemical properties such as oil resistance, thermal properties like resistance to high temperature, or physical properties like hardness or tensile strength." The result is a growing range of products that include more resilient body panels for cars, more fire-resistant insulation for houses, and of course, more comfortable handles for tools, utensils—and toothbrushes. There's an environmental bonus, too: thermoplastic elastomers are fairly easy to recycle.



Dr. Choo is pursuing his work at Lambton College's Centre of Excellence for Process Manufacturing, where he is head of the research team. The recently-opened facility—funded in part with an investment by the Ontario Innovation Trust—enables scientists and engineers to investigate a wide range of new chemical manufacturing technologies, including state of the art process control and automation systems.

Sarnia is a major Canadian hub for the petroleum industry, and several petro-chemical companies are actively partnering in research at the college. They benefit from the fact that the Lambton centre is a "pilot scale" facility that can duplicate a real manufacturing environment. Technologies developed here can easily and quickly be scaled up and transferred to the factory floor.

"Everything we're doing is closely related to market needs," explains Dr. Choo. "That's a role I see the college can play: shortening the commercialization time for innovative products."

Project: Centre of Excellence for Process Manufacturing: Production of Thermosplastic Elastomers for Thermoforming and Thermoplastic Vulcanizates
Institution: Lambton College of Applied Arts & Technology
Research Sector: Engineering
Principal Investigator: Kim Choo
Trust Investment: $722,786
Total research investment from all sources: $1,806,964

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Infrastructure for Innovation
About the Ontario Innovation Trust

The Ontario Innovation Trust was created in 1999 by the Government of Ontario to invest in research equipment and facilities at Ontario's universities, colleges, hospitals and other non-profit research institutions. The Trust is governed by a volunteer Board of Directors, according to the terms of a Trust agreement established by the Ontario government. A small permanent staff looks after day-to-day operations.

Since its inception, the Trust has committed almost $843 million to strengthen Ontario's position in the global marketplace of ideas. This represents more than a third of the $2.44 billion in total funding that has been invested in Trust-supported projects.