

Refining Redefined

Olefins – the extracts used as the basis for products such as plastics, lubricants, and antifreeze – represent the largest group of petrochemicals manufactured in the world. They are also among the most energy intensive, since the process of extracting them calls for a facility lined with thousands of metres of pipe, all of which must be heated to temperatures upward of 1,000 degrees centigrade.

"The furnace structure is several stories, high," says Steve Petrone, founder and CEO of Quantiam Technologies in Edmonton. "When you're trying to maintain an entire furnace, which is huge, at those temperatures, your losses are so high that the energy requirements are not linear with temperature."

His company is trying to alter that equation. Whereas currently, the walls inside the furnace are coated with a material that is intended to remain neutral during the thermal extraction process, Quantiam has used nanotechnology to design a catalytic coating that participates in the process and brings down the required operating temperature by 50 to 100 degrees.

That might not sound like much, but the difference could be worth billions of dollars in energy savings to plant operators around the world. And in countries like Canada, which have approved the Kyoto Protocol, it allows these operators to decrease their greenhouse gas emissions at the same time.

Mr. Petrone expects that solution to become even more sophisticated, with research intended to further enhance the catalytic participation of the furnace coating, so that the temperature can be dropped as low as 700 to 800 degrees.

"That won't be an incremental change," he says. "That will be a total paradigm shift to the industry."