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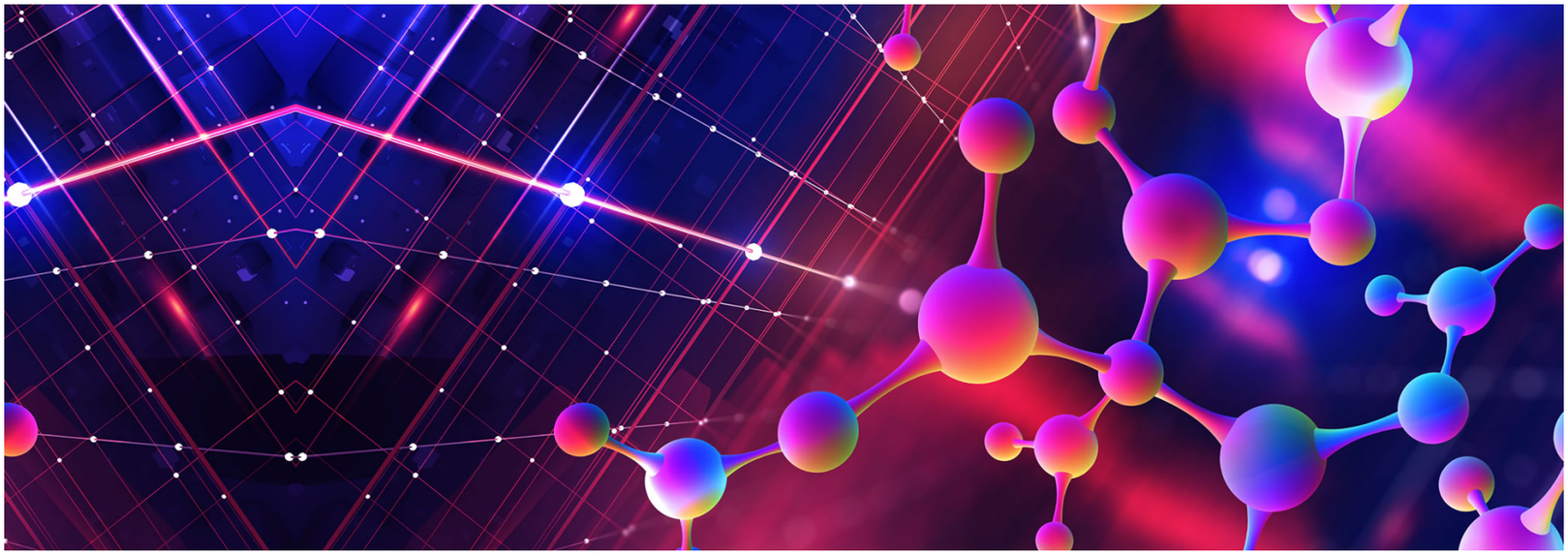

TOMSKNEFTEKHIM LAUNCHES A DIGITAL REACTOR MODEL

SIBUR introduces a digital solution to model gas chemical reactions.

SIBUR has rolled out Russia's one-of-a-kind solution that makes it possible to accurately model physical and chemical processes at petrochemical facilities. The pilot was launched at Tomskneftekhim, where a low-density polyethylene reactor was digitally modelled to deliver a considerable reduction in related operational expenses.

THE DIGITAL MODEL OF A GAS CHEMICAL REACTOR PROVIDES ROOM FOR MANOEUVRE AND EXPERIMENTATION AS COMPANIES SEARCH FOR THE BEST AND MOST EFFICIENT OPERATIONAL MODE WITH ZERO IDLE TIME

Ethylene is polymerised at a pressure of 2,400 atm, which is twice as much as at the bottom of the Mariana Trench. For a long time, the polymerisation process was only modelled for academic purposes. SIBUR, with the help of its own R&D arm, has become one of the global trailblazers in making this a practical effort.

"One of our key objectives is to maximise the economic efficiency of production, especially amid growing competition in the global markets," said Daria Borisova, Member of the Management Board and Managing Director supervising SIBUR's R&D activities. "The Company has long been focused on modelling and optimising accompanying production processes, generating economic benefits that amount to hundreds of millions of roubles annually," notes Borisova. "Having successfully begun to model reaction-based processes, the cornerstone of petrochemical production, SIBUR now has the R&D expertise to compete on an equal footing with the industry's global leaders. Moreover, this is a perfect example of our contribution to the scientific and production capacity of the Russian manufacturing industry and import substitution in intellectually intensive fields."

In continuous production in the petrochemical industry, even minor tweaks in the process can result in strong benefits or major losses. The risks include non-conforming products with substandard quality and loss of margin. The digital model of a gas chemical reactor developed by NIOST provides room for manoeuvre and experimentation as companies search for the best and most efficient operational mode with zero idle time.

The digital model of the Tomsk reactor has already helped to test 139 combinations of process parameters and rate of consumption for the feedstock and reaction initiators. As a result, the best possible mode of operation was determined, reducing the rate of consumption of costly additives by 12% without compromising on quality. The expected annual savings could reach RUB 50–60 million facility-wide.

WHILE THE MODEL IS UNIQUE FOR EACH UNIT, OUR SUCCESSFUL EXPERIENCE IN TOMSK CAN BE LEVERAGED TO PLAN DIGITAL MODELS FOR SIBUR'S OTHER PRODUCTION FACILITIES, INCLUDING THOSE OPERATING ON A LARGE SCALE

"Another area of optimisation is focused on identifying process parameters that will boost productivity. This many physical experiments would take a decade to complete and, assuming potential losses, would cost the Company about RUB 1 billion. Digital calculations, including the development of the model itself, required a year and a half of work and cost us almost RUB 15 million," said Vladimir Bushkov, Executive Director at NIOST.

"While the model is unique for each unit, our successful experience in Tomsk can be leveraged to plan digital models for SIBUR's other production facilities, including those operating on a large scale," added Sergey Tutov, Head of SIBUR's R&D function. Going forward, the digital model can potentially be used to determine process parameters for new product grades. "In addition, SIBUR operates both new and older plants, with some of them dating back to the last century (1993 in the case of the Tomsk reactor). Digital models are a way for those facilities to aim for alignment with global petrochemical benchmarks without a major renovation."