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## **Technology for Producing Isoprene from Biomass Developed Jointly with Yokohama Rubber and RIKEN**

**World's First Successful Creation of Cells that Generate an Artificial Reaction**

Zeon Corporation

**Zeon Corporation (President: Kimiaki Tanaka), in joint research with RIKEN (a National Research and Development Agency) and Yokohama Rubber Co., Ltd., has developed a new technology for the efficient and stable production of isoprene monomers (isoprene) from biomass (biotic resources). Isoprene is the raw material for polyisoprene rubber, which is mainly used for automobile tires. Industrial isoprene is currently being produced as a byproduct of the naphtha pyrolysis. Development of this new technology will reduce future dependence on petroleum and is expected to contribute to reducing carbon dioxide, widely considered to be a cause of global warming.**

Zeon has been engaged in joint research with RIKEN and Yokohama Rubber since 2013, and in 2015 discovered a new isoprene-synthesizing process using computer-based in-silico metabolic design technology\*. Building on this discovery, the group developed the world's first technology to achieve in-vivo creation of isoprene from a biomass (sugar) that serves as the starting material. The group has also succeeded in synthesizing polyisoprene rubber through the polymerization of in-vivo generated isoprene. The research took full advantage of the cell design and plant science technologies of the RIKEN Center for Sustainable Resource Science (CSRS).

It is widely known that isoprene is produced from mevalonic acid (an intermediate substance formed from sugar) through a five-stage reaction in the natural environment. However, through the research a new artificial metabolic pathway that reduces the process to two stages was discovered. Also highly active enzymes with phenomenal isoprene-producing capability were created. Introducing the artificial pathway and enzymes into colon bacilli gives the bacteria an isoprene-generating ability that it lacks in nature, opening the way to the efficient and stable artificial synthesis of isoprene. The research team has also confirmed that this technology can be applied to butadiene-based synthetic rubber and other diene rubbers.

The Zeon Group will continue to engage in research that transcends the boundaries of industry, government, and academia to contribute to the sustainable development of mankind and preservation of the global environment.

\*A technology for designing new artificial metabolic reactions on computers



In-cell (in vivo) synthesis of isoprene (left) and polyisoprene rubber polymerized using the new technology



For further information

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PRESS RELEASE

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