

Customized Rubbers

**KIT Scientists Develop Novel Process for the Production of Special Rubbers
in Cooperation with Lanxess Deutschland GmbH**



Customized products: KIT scientists and Lanxess Deutschland GmbH develop a new technology to produce rubbers. (Photo: Institut für Technische Chemie und Polymerchemie, KIT)

Scientists of Karlsruhe Institute of Technology (KIT) and Lanxess Deutschland GmbH, one of the largest producers of rubbers worldwide, have developed a new process to simply and efficiently produce specific tailor-made synthetic rubbers. These specific rubbers are synthesized by an integrated solution polymerization approach, resources are therefore saved, and the rubbers produced are of high purity. No major purification expenditure is required.

So far, rubbers have often been polymerized in an aqueous emulsion like many synthetic polymers. Numerous complex additives are required to obtain high-quality rubber. As processing, coagulation, and purification of the rubber are needed, the process that has been used by industry since the early 20th century to the present is highly complex and demanding.

KIT scientists under the direction of Professor Christopher Barner-Kowollik have now developed a new innovative process to produce

**Monika Landgraf
Press Officer (acting)**

Kaiserstraße 12
76131 Karlsruhe, Germany
Phone: +49 721 608-4 7414
Fax: +49 721 608-4 3658

**For further information,
please contact:**

Inge Arnold
Public Relations and
Marketing (PKM)
Phone: +49 721 608-2 2861
Fax: +49 721 608-2 5080
E-mail: inge.arnold@kit.edu

certain rubbers with exactly defined properties in cooperation with the Lanxess team headed by Dr. Sven Brandau and Dr. Michael Klimpel. For this purpose, they used a method from the class of living radical solution polymerization, by means of which the molecular architecture of synthesized polymers can be adjusted very precisely.

Within the framework of this project, the team of researchers for the first time succeeded in using this relatively young type of polymerization for the synthesis of a rubber used on a large technical scale. With the help of the developed process, integrated synthesis can be accomplished, resources can be saved, and the rubbers produced are of high purity without an additional expensive purification process being required.

Professor Barner-Kowollik summarizes the advantages of this new process as follows: "The new process has two decisive advantages. Firstly, it is possible to precisely adjust the size and structure of the polymers and, hence, their properties. Secondly, the production process is largely simplified. From the scientific point of view, we have entered virgin soil, as living radical polymerization so far has never been applied to such a rubber system."

Dr. Sven Brandau, project leader from Lanxess, adds: "This new technology has the potential of placing the production process and the properties of synthetic rubbers on a completely new and efficient platform. We have created new possibilities of synthesizing tailor made rubbers." The KIT/Lanxess team hopes to advance and further develop their scientific and technical innovation.

Polymers and Rubbers

Polymer materials, commonly referred to as plastics, are indispensable in our everyday life. Plastics are composed of gigantic molecules that consist of small individual components, the monomers. As monomers exist in various chemical variations, polymers may have a large range of properties. For example, polymers are used in paints and varnishes, in medicine and medical products, in clothing and shoes, in housings and packagings, in computer chips, construction materials as well as in vehicles, airplanes, and ships. One of the most important classes of polymer materials are rubbers. Various types of synthetic rubbers exist and therefore they can be used in many applications, in oil-resistant hoses of cars, in tires, flooring, soles of shoes, in oil production, or sealing rings of fuel

tanks of spacecrafts.

Karlsruhe Institute of Technology (KIT) is a public corporation and state institution of Baden-Wuerttemberg, Germany. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

This press release is available on the internet at www.kit.edu.