

New impetus for polymer research: collaborative research centre at the University of Halle receives nine million euros

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The Collaborative Research Centre SFB/Transregio 102 (CRC) "Polymers under Multiple Constraints" can continue its work at Martin Luther University Halle-Wittenberg (MLU) until 2023. The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) is providing nine million euros as part of a third round of funding for the CRC. In the new round, the polymer scientists will broaden their scope to investigate so-called hybrid polymers, a combination of synthetic polymers and proteins. They could be significant for both medicine and materials research.

The collaborative research centre was established in 2011. Since then it has produced more than 200 publications in international journals and more than 30 completed PhDs. An integrated research training group has also been established to systematically foster young researchers. "Thanks to many years of DFG funding, we have made significant progress in our research programme and have developed into a centre for polymer research with international visibility," says CRC spokesman Professor Thomas Thurn-Albrecht. One example is a newly established research cooperation between the Faculty of Natural Sciences II at MLU and the renowned Changchun Institute of Applied Chemistry in China.

The work of the CRC has so far concentrated on the properties and different microscopic structure formation processes of two groups of polymers: semi-crystalline polymers and so-called amyloids. Semi-crystalline polymers make up a large part of the plastics produced worldwide. Amyloids are aggregates of proteins that can be found in the human body and are e.g. associated with the development of diseases such as Alzheimer's.

In the new funding round, the researchers are now also investigating the properties and structure formation of so-called hybrid polymers that consist of biological and synthetic parts. To do this, they are using methods and models they developed and tested during the previous funding periods. "We want to gain a better understanding of how these novel hybrid molecules influence each other and which properties result from their interaction. I think that this could also lead to longer-term perspectives that would strengthen the MLU's core research area on materials science," says Thurn-Albrecht.

In the future, new findings could, among other things, lay important groundwork for the development of novel materials with tailor-made functions. "The better we understand the structure-forming processes, the better they can be controlled and influenced. This also applies to the aggregated proteins, the amyloids," explains Thurn-Albrecht. In this area, the scientists want to provide the foundation for medical applications, like research into neurodegenerative diseases such as Alzheimer's disease. The findings on hybrid polymers could also provide further insights.

Participating in the CRC/Transregio TRR 102 alongside MLU are Leipzig University, the Leibniz Institute for Surface Engineering in Leipzig, the Fraunhofer Institute for Microstructure of Materials and Systems IMWS in Halle and the Max Planck Institute for Colloids and Interfaces in Potsdam/Golm.

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