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## Chemistry Nobel Prize for Benjamin List

The researcher is honored for his discoveries in the field of asymmetric organocatalysis



**Professor Ben List © Frank Vinken  
für MPI für Kohlenforschung**

Benjamin List, director at the Max-Planck-Institut für Kohlenforschung, will receive the 2021 Nobel Prize in Chemistry, together with David W. C. MacMillan from Princeton University for their work on asymmetric organocatalysis. The two researchers discovered that organic molecules are also suitable catalysts for chemical reactions. Until this discovery scientists assumed that only enzymes and metals, including often toxic heavy metals or expensive and rare precious

metals, could accelerate chemical reactions and guide them in a desired direction. Ben List found that also small organic molecules – such as proline – are capable of catalyzing chemical reactions very efficiently, and at the same time are non-toxic. Moreover, the small organic molecules that Benjamin List and David McMillan introduced as catalysts are suitable for asymmetric synthesis: In this process, only one of two enantiomers is formed – i.e. molecules that are as similar as the left and right hand, and cannot be superimposed onto each other. Such molecules are involved in all biological processes and play an important role as pharmaceuticals. In continuation of his seminal discovery, List succeeded in developing the organocatalysts further into enzyme-like compounds and using them in many processes in such a way that significantly fewer unwanted by-products are produced, synthesis paths are shortened, and reactions can thus be carried out in a more resource- and energy-efficient manner.

"All colleagues are proud that with him a second "Kohlenforscher" after Karl Ziegler has now joined the ranks of Nobel laureates," said Ferdi Schüth, the managing director. "With organocatalysis, Ben List has discovered a new type of catalysis that is now used in numerous laboratories around the world in academic and industrial research and is used for a wide range of syntheses," said Schüth. The entire institute treated the newly minted Nobel laureate to a

goosebump reception: Nearly all institute members stood on the balconies of the laboratory building to cheer Ben List's arrival on campus. His research group had organized a reception in the lecture hall so that the entire institute could duly celebrate this outstanding recognition with him after the press conference.

## **About Ben List**

Benjamin List was born in Frankfurt am Main in 1968. His family has a tradition in the natural sciences: His great-great-grandfather was the chemist Jacob Volhard, and his aunt is Christiane Nüsslein-Volhard, herself a Max Planck Director and Nobel Prize winner in physiology and medicine. Ben List studied at the Free University of Berlin and received his Ph.D. from the Johann Wolfgang Goethe University in Frankfurt am Main. Between 1993 and 2003, he conducted research at the Scripps Research Institute in La Jolla, USA. In 2003 he moved to the Max-Planck-Institut für Kohlenforschung, first as a research group leader and since 2005 as director of the Department for Homogeneous Catalysis.

Ben List has received many prestigious scientific awards for his innovative research, such as membership in the National Academy of Sciences Leopoldina, the Gottfried Wilhelm Leibniz Prize, two consecutive ERC Advanced Grants from the European Commission, the Arthur C. Cope Scholar Award and most recently the Herbert C. Brown Award. For the Max-Planck-Institut für Kohlenforschung in Mülheim, this is already the second Nobel Prize in its more than 100-year research history: In 1963, Institute Director Karl Ziegler received the Nobel Prize in Chemistry for the discovery of the Ziegler-Natta polymerization – together with Giulio Natta.

More information and pictures on our website:

<https://www.kofo.mpg.de/20210910-chemistry-nobel-prize-for-ben-list?c=217279>

<https://www.kofo.mpg.de/en/research/homogeneous-catalysis>

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