

**PRESS RELEASE**

**French physicist Ludwik Leibler named European Inventor Award 2015 finalist for his work on vitrimers, a new category of plastic**

* **Pioneer in polymer physics and chemistry: Award-wining CNRS researcher developed new eco-friendly class of plastic, called vitrimers**
* **Exciting possibilities for numerous industry sectors: the glass-like plastic can easily be repaired, is malleable, recyclable and robust**
* **From Poland to Paris: Leibler was born in Warsaw and today is director of research at France’s national research centre**
* **EPO President Battistelli: “Ludwik Leibler’s new material opens up tremendous new opportunities and trail blazes a new generation of ecological plastics.”**

**Munich/Paris, 21 April 2015 –** Picture this: car scratches or broken toys being “healed” by a miracle material. Physicist Ludwik Leibler was inspired by the vision of such a substance, and together with his team, Dr François-Genes Tournilhac and Dr Corinne Soulié-Ziakovic, he made a major breakthrough in 2011: He developed vitrimers as a new class of plastic. The new material is not only light, robust and malleable; it also displays self-healing abilities when heated. Moreover, the plastic can be recycled and is thus environmentally friendly. The major discovery of vitrimers revolutionised the polymer industry and made the 63-year-old Polish-born French scientist Ludwik Leibler world famous. For this achievement, the European Patent Office (EPO) has named Leibler a European Inventor Award 2015 finalist in the category Research. The winners of the 10th edition of the annual innovation prize will be announced at a ceremony in Paris on 11 June.

“Ludwik Leibler’s innovation not only opens up tremendous new opportunities for industry thanks to its physical characteristics,” said EPO President Benoît Battistelli announcing this year’s finalists. “The material also facilitates the prevention of vast amounts of plastic waste. Ludwik Leibler’s research clearly trail blazes a new generation of plastics.”

**Order of the day: Make everything light and more eco-friendly**

Whether it’s aircraft and vehicle manufacturing or electronics, building and the sports industry – many industry sectors require plastics and plastic composites in order to exchange metals for materials that are lighter but just as robust. For a long time, thermoset plastics, which are extremely durable, were considered the only alternative because they have mechanical properties as well as thermal and chemical resistance. However, they have one big disadvantage: Once moulded into shapes, this plastic cannot be re-shaped which means that it is basically not recyclable. The damaging effects of plastic waste that is scarcely degradable constitute a major environmental issue today.

**Malleable like glass but unbreakable**

Together with his team at ESPCI Paris Tech (Ecole Supérieure de Physique et Chimie Industrielles), Leibler tried to find a plastic that was as robust as thermoset plastic or rubber when solid but could be formed like glass when heated. Their first vitrimer synthesis was based on coupling of epoxy with carboxylic acids and adding a catalyst. Today other industrially relevant plastic chemistries can be employed to make all kinds of vitrimers with a wide range of properties. The ingenious thing about vitrimers is that they are made of molecules connected to form a network, which when heated can rapidly change its structure without altering the actual number of connections. In contrast to other plastics, vitrimers can be re-shaped after having been hardened and are therefore also easily recyclable. Their self-healing ability opens up numerous new industrial applications: When heated, vitrimers can be welded like metals. This allows for complex object shapes that are impossible to obtain by moulding or for which making a mould would be too expensive.

**How a Polish physicist becomes a French research director**

Born in Poland and now a French national, Ludwik Leibler has been one of France’s leading scientists for over 30 years. He has filed 47 patents and has been awarded numerous prestigious prizes by various organisations in Europe and the US for his research in physics and chemistry. He received his PhD in Theoretical Physics from Warsaw University, followed by a year of post-doctoral research under Nobel Prize Winner Pierre-Gilles de Gennes at the Collège de France in Paris. He then carried out research for CNRS, the National Centre for Scientific Research, in Strasbourg and after that in Paris. In 1996 he became a founding director of a joint laboratory between CNRS and a French chemical company now named Arkema. Always paying close attention to industry needs, he is responsible for numerous ground-breaking innovations in polymer physics which have won him international acclaim. Since 1985, Leibler has been director of research at the CNRS and since 2001, adjunct professor at ESPCI ParisTech where he is also director of the Laboratory for Soft Matter
and Chemistry.

**Visionary wanting to heal wounds**

Ludwik Leibler’s molecule compounds also play a vital role for another important innovation: When torn, so-called “smart rubber” can repair itself simply by holding the fractured sides together. Based on his revolutionary work with polymers and self-healing materials, the visionary scientist has also advanced research into new glue for biological tissue using silica sand nanoparticles. Whereas the molecules of vitrimers only build links among themselves, the molecules of nanoparticles also connect with other materials. This method of sealing skin wounds, stopping bleeding after resection of an organ or attaching medical devices to tissue and organs without stitching has enormous potential in surgical practice.

**Additional resources**

[**Video and photo material**](http://www.epo.org/news-issues/press/european-inventor-award/leibler.html)

[**Read more about the inventor**](http://185.49.16.67:8080/razuna/raz1/dam/index.cfm?fa=c.sf&f=6E37BF0F518E45D2B82784A2A8C92F6E&v=o)

 **View the patent:** [**EP1465930 B1**](http://worldwide.espacenet.com/publicationDetails/biblio?CC=EP&NR=1465930B1&KC=B1&FT=D&ND=4&date=20060503&DB=EPODOC&locale=en_EP)

[**Ten years of the European Inventor Award: a retrospective look at the inventors and ideas that have changed our lives**](http://www.epo.org/news-issues/press/releases/archive/2015/20150122.html)

[**About the European Patent Office (EPO)**](http://www.epo.org/news-issues/press/background/epo.html)

[**Study on the economic impact of patents and other IP rights**](http://www.epo.org/news-issues/news/2013/20130930.html)

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