Japanese Inventor Selected as Finalist for the European Inventor Award 2024

MUNICH, GERMANY, May 31, 2024 /EINPresswire.com/ -- Magnets are all around us, they drive a wide array of modern technologies and exist in one way or another in almost every field on Earth. Permanent neodymium magnets are found nowadays in mobile phones, MRI scanners, electric vehicle motors, wind turbines and security systems as well as in jewellery, ABS brakes, pumps and generators. Their roles go from fastening boxes to helping generate electricity, guiding medical equipment and levitating components. The multifunctional benefits of magnets have changed the way our world works, and Sagawa's neodymium magnets are a driving force behind the pervasive use of magnets worldwide. In recognition of his achievement, Sagawa is a finalist in the 'Non-EPO Countries' category of the European Inventor Award 2024, having been selected by an independent jury from among 550 candidates for this year's edition.

Making a magnet

Motivated by the high price of cobalt at the time and inspired by the widespread availability and lower cost of iron, Sagawa set out in the late 70s and early 80s to find a replacement of cobalt-based magnet, but still be able to generate a robust, permanent magnetic field. He experimented with a wide variety of intermetallic compounds and phases before a breakthrough in the process led him to create the strong magnet. The process he developed is called sintering - a process that bonds the ground particles of his various magnetic components together using heat treatment. While magnets with similar compounds were being developed at the same time, this process made Sagawa's magnet the strongest in the market.

"Each combination of rare-earth and iron ingredients has a Curie temperature at which level it loses magnetism. I understood I had to come up with a compound with a high Curie temperature. I once attended a lecture where it was explained that the reason why the Curie temperature is low in these combinations is because the distance between iron atoms in any compound that is made out of a blend of rare earth and iron is too small. This gave me the idea to insert a very small atom, for example, boron, or carbon, into the compounds, to increase the distance between the iron atoms and hopefully, increase the Curie temperature", Sagawa

explained.

A quest for the perfect magnet
At 80 years old, Sagawa is still working on his magnets. He is still developing and patenting improvements to his neodymium magnet and the sintering process. He is still trying to find ways to reduce the amount of a relatively scarce element, dysprosium, required for his mixture. The dysprosium is currently added to the magnets to increase resistance to demagnetisation (tolerating higher working temperatures).

Masato Sagawa is one of three finalists in the 'Non-EPO Countries' category of the European Inventor Award 2024. The other finalists recognised for outstanding work are a Brazilian team led by Fernando Catalano and Micael Carmo for reducing noise and carbon emissions in air travel and American-based David Fattal for his advancements in display optics and software to create glasses-free 3D imaging. The EPO will announce the winners during a ceremony live-streamed here from Malta on 9 July 2024. In addition to each category, the EPO will reveal the Popular Prize winner, chosen by online public vote. Voting will remain open until the day of the ceremony.

Find more information about the invention's impact, the technology and the inventors' stories here.

Loredana Domingo
MARCO
email us here