



VANILLIN BATTERIES AND CELLULOSE FIBRE SKATEBOARDS

Stefan Spirk makes batteries out of vanillin and bakes skateboards out of cellulose fibre. A glimpse into the everyday work of a researcher with an unusual combination of topics.



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Stefan Spirk has just returned to Graz from a conference in Japan. In his bathroom there are piles of laundry from his trip to the Far East and a previous project meeting in Spain; on his office desk are sweets with strawberry, matcha and chocolate flavours that he managed to cram into his suitcase. Sitting on a dark green leather couch, he talks about batteries made of vanillin, AI-generated electricity storage and skateboards with a core of cellulose fibre, baked with a kind of yeast dough. As a chemist and materials scientist, he wants to make a difference in the world, to make it more sustainable and environmentally friendly. That is why, in addition to his academic career at TU Graz, he is also involved in the start-up Ecolyte, which he founded in 2022 with four colleagues and with which he wants to produce highly efficient and, above all, sustainable electricity storage systems. "A large EU-project has just started and I am currently trying to familiarise myself with the topic of artificial intelligence," he says. Artificial intelligence is being used to find and optimise the best possible storage options. The aim is to obtain an environmentally friendly version of redox flow batteries that contain conventional vanillin instead of redox-active elements. In addition to the storage medium, other battery components, such as the membrane and electrode, should also be designed to be environmentally friendly.

BASICS AND APPLICATION

The entrepreneurial side of research is important to Stefan Spirk because, in tune with his philosophy, something can be developed only in a combination of basic and application-oriented research: "It's only in basic research that development would be too slow for me. But even when something ground-breaking is discovered, it still takes an eternity to develop an application. At

Everything on the vanillin electricity storage system.

A closer look on the cellulose fibre skateboard.



the same time, an application only emerges with the appropriate foundations." In addition to his start-up, he is also working on another project that deals with the basics of energy storage: "So I don't have to turn everything into money," he explains with a smile.

FREEDOM, TEACHING AND TRAVEL

Without coffee he is unbearable, he says, and before a deadline he is at his best. "I find it hard to motivate myself for a long time, but when the deadline approaches, my productivity explodes," he explains honestly about his approach. Loud music helps him in particular – electro-punk, heavy metal and jazz echo through the night hours – the time when Spirk works most effectively. "In my papers I sometimes like to write dedications to the musicians who have helped me during the many hours of work," he says, encouraging other researchers to search for names in his work.

It is precisely the freedom and independence in science that he enjoys as an associate professor that persuaded him to take the path of research at a university. And teaching, which is part of his tasks: "It's unbelievable fun passing on knowledge. With teaching, you can directly make a difference in society."

SKATEBOARDS FROM YEAST DOUGH

Another project is already in the works; for the time after his start-up Ecolyte has "grown up": "I think it's cool to set up a project. But it has to run on its own at some point, and then it's time for something new." The new idea has to do with the project meeting in Spain: colleagues from the Institute for Vehicle Safety brought a skateboard with them. The surprise was that the core consists of cellulose fibres foamed with yeast, which were developed at the institute. "Today, such boards are made of plastic foam. We want to replace this plastic foam with cellulose. It's a bit like baking bread." ■