Researchers take next step toward better performing batteries using less critical raw materials

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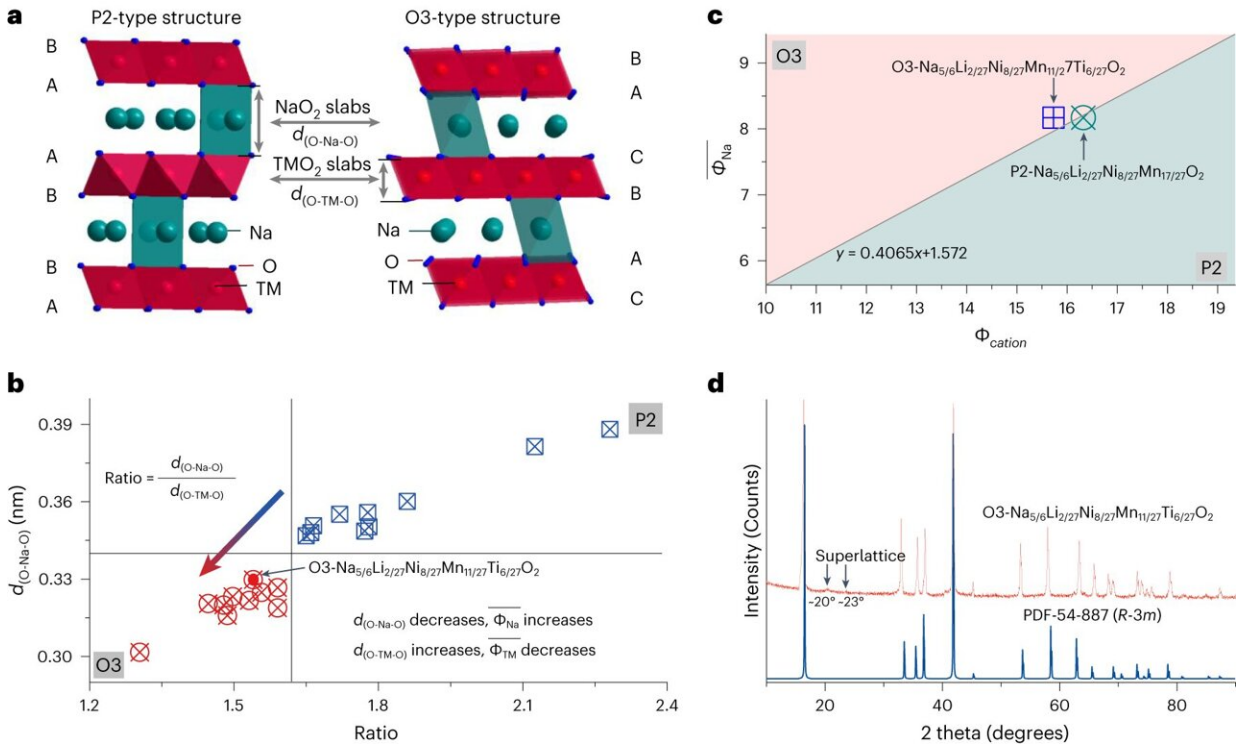

Designing O_3-type layered oxides. Credit: *Nature Sustainability* (2024). DOI: 10.1038/s41893-024-01266-1

Marnix Wagemaker and Alexandros Vasileiadis in collaboration with researchers from the Chinese Academy of Sciences have published a

paper in *Nature Sustainability* on fast-charging sodium-ion batteries and improvements made to the negative electrode. These can be made from organic materials. This reduces the dependence on rare materials that do not come from Europe.

The Delft researchers have also improved the other side and published about it. The new article details the development of a new positive electrode, based on design principles they published in *Science* in 2020 titled "Rational design of layered oxide materials for sodium-ion batteries."

From these design principles, a material has been designed to combine the best of two possible structures. High energy density is combined with fast charging. As an added bonus, the material appears to change its structure very gradually during charging and discharging, making it last even longer. It also contains no cobalt as is still common in Li-ion cathodes.

Thanks to the growing knowledge about these battery materials, research in this area will continue. In addition to Li-ion batteries research, sodium-ion research will also be addressed nationally. The battery research will be further expanded, allowing this technology to be applied to national and European markets.

More information: Qidi Wang et al, Fast-charge high-voltage layered cathodes for sodium-ion batteries, *Nature Sustainability* (2024). DOI: 10.1038/s41893-024-01266-1

Provided by Delft University of Technology