

Tailored Silicon/Carbon Compounds for Printed Li-Ion Anodes



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Invited for this month's cover picture is the group and collaboration partners of Prof. Horst Hahn from the Institute of Nanotechnology (INT) at Karlsruhe Institute of Technology (KIT). The cover picture shows printed silicon anodes coated with carbon for powering of electrolyte-gated transistors. Read the full text of the Article at 10.1002/batt.202000052.

What is in your opinion an upcoming research theme likely to become one of the 'hot topics' in the near future?

In our opinion, tailorable properties of energy materials will be one of the 'hot topics' in the near future. As presented in the study, the developed room-temperature printing process can be utilized to produce Li-ion battery electrodes, which can be tailored regarding shape, capacity, and printability. The assembled full cells containing NCM as cathodes show promising electrochemical properties, are capable to power electrolyte-gated transistors, and exhibit potential application to power sensors and low-power electronics.

What was the biggest challenge?

The most challenging tasks in this study were the optimization of the rheological properties of the inks for the electrode printing process and to match the requirements for powering the printed graphene transistor. The component ratio of the ink, i.e., active material, conductive carbon, and binder, had to be additionally adjusted in order to tailor the electronic conductivity, kinetics, and capacity. To achieve high capacities and still maintaining good printability, was the most time consuming part of the work.

Who contributed to the idea behind the cover?

Parvathy A. Sukkurji proposed the overall conceptual design and idea about the cover image. The cover image graphics was prepared by Christian Grupe, graphics designer at Karlsruhe Institute of Technology.

