**Supporting Information**

**Towards an enhanced understanding of the particle size effect on conversion/alloying lithium-ion anodes**

Jakob Asenbauer1,2, Dominik Horny3, Mayokun Olutogun1,2, Katrin Schulz3,4,\*, Dominic Bresser1,2,\*

*1 Helmholtz Institute Ulm (HIU), 89081 Ulm, Germany*

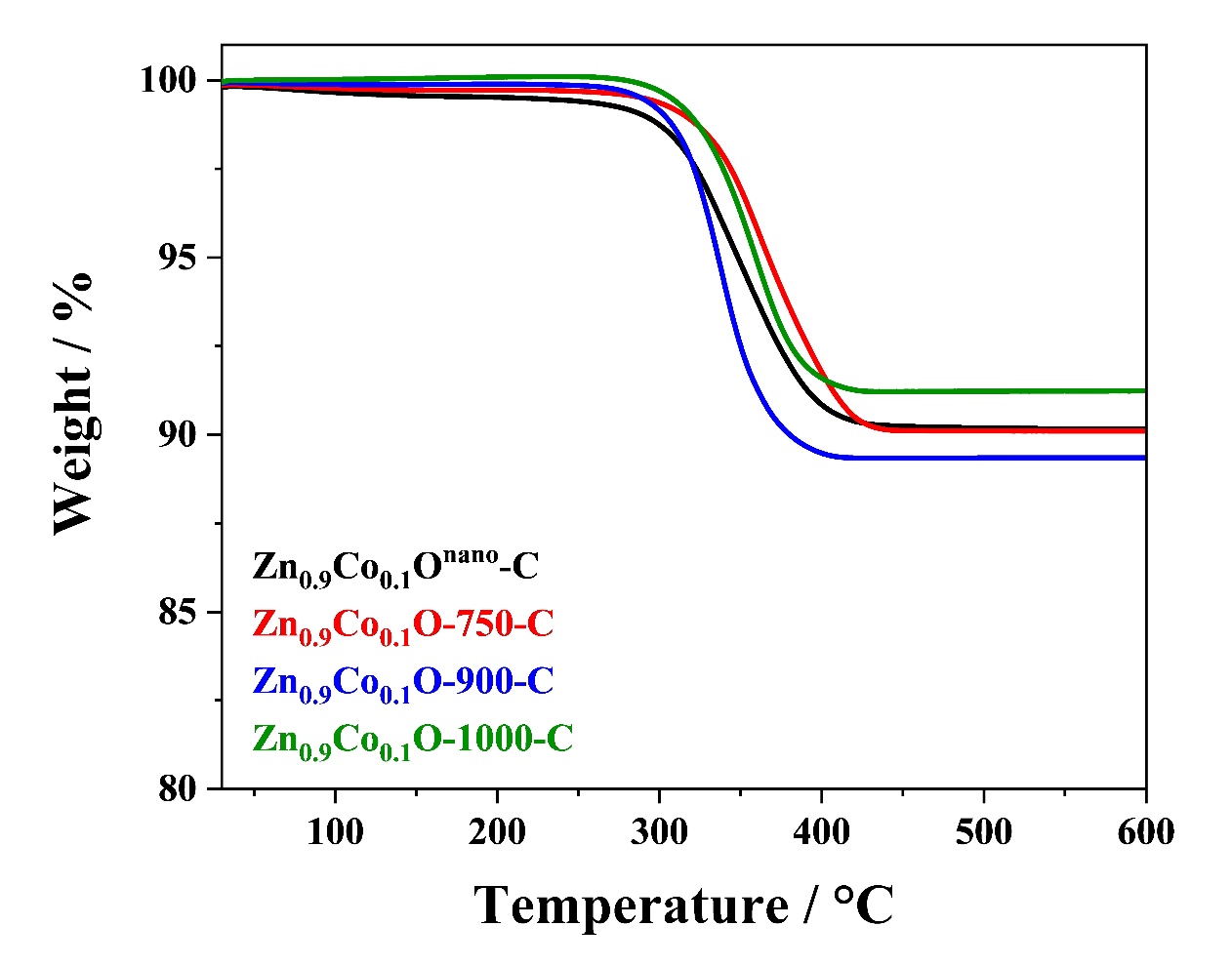
*2 Karlsruhe Institute of Technology (KIT), 76021 Karlsruhe, Germany*

*3 Institute for Applied Materials (IAM), Karlsruhe Institute of Technology (KIT), 76131 Karlsruhe, Germany*

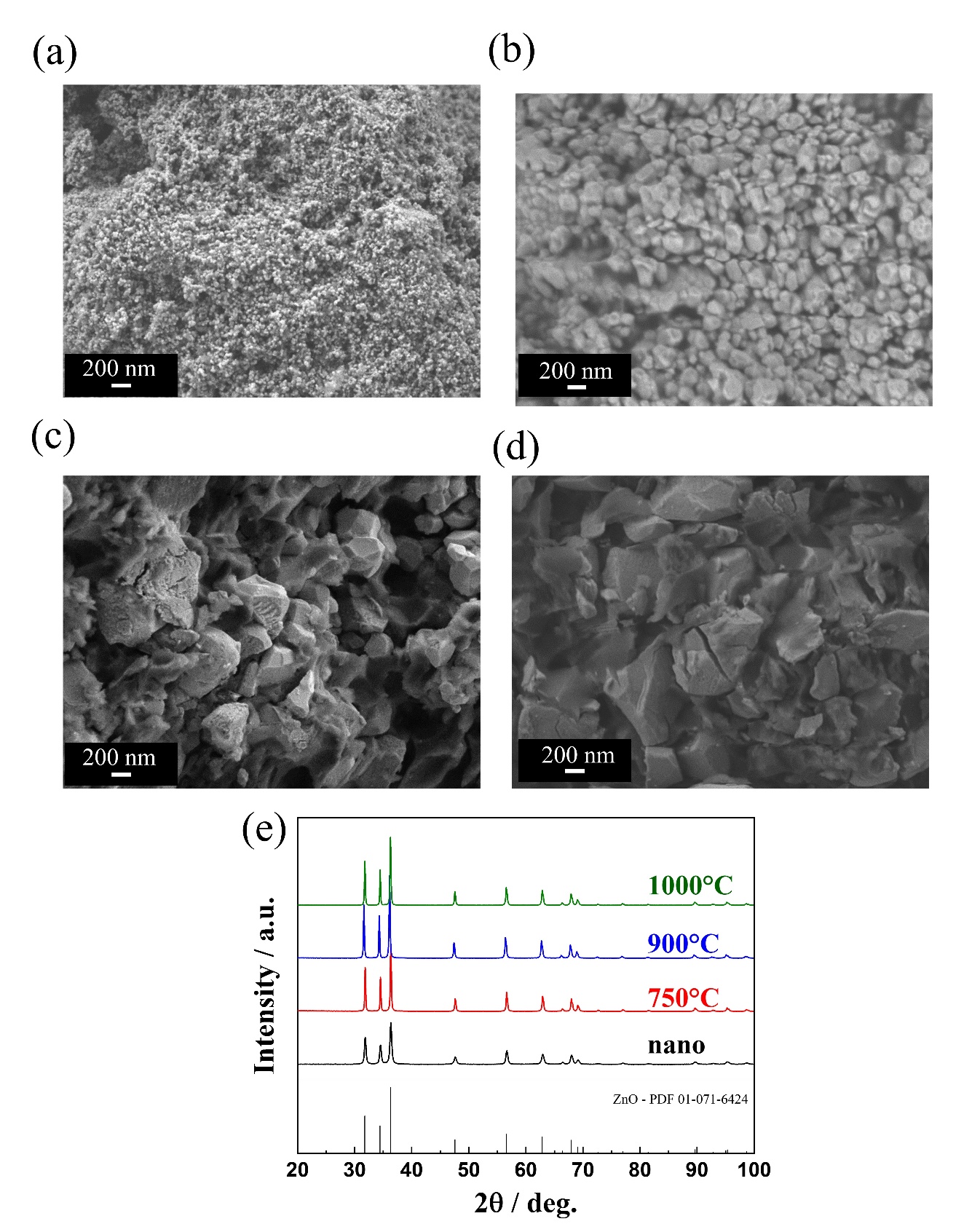
*4 Karlsruhe University of Applied Sciences, 76133, Karlsruhe, Germany*

**Keywords:** particle size; conversion; alloying; anode; lithium-ion battery

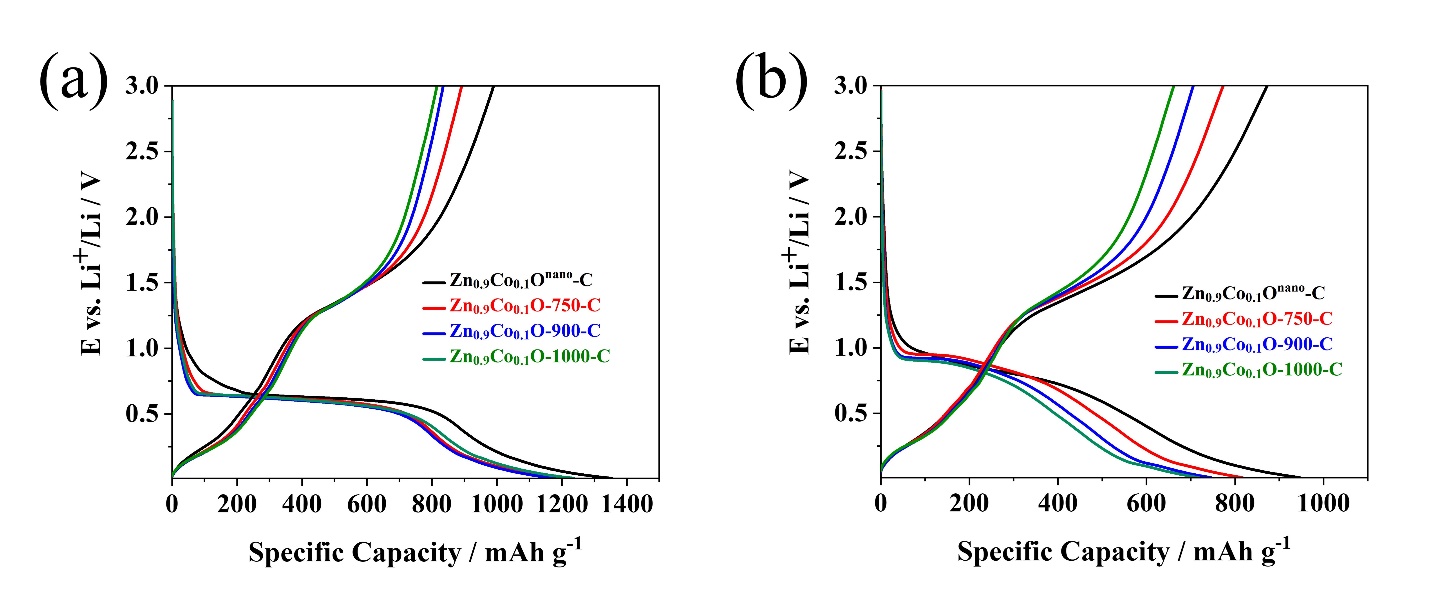
**\*Corresponding authors:** [dominic.bresser@kit.edu](mailto:dominic.bresser@kit.edu) ; [Katrin.Schulz@h-ka.de](mailto:Katrin.Schulz@h-ka.de)



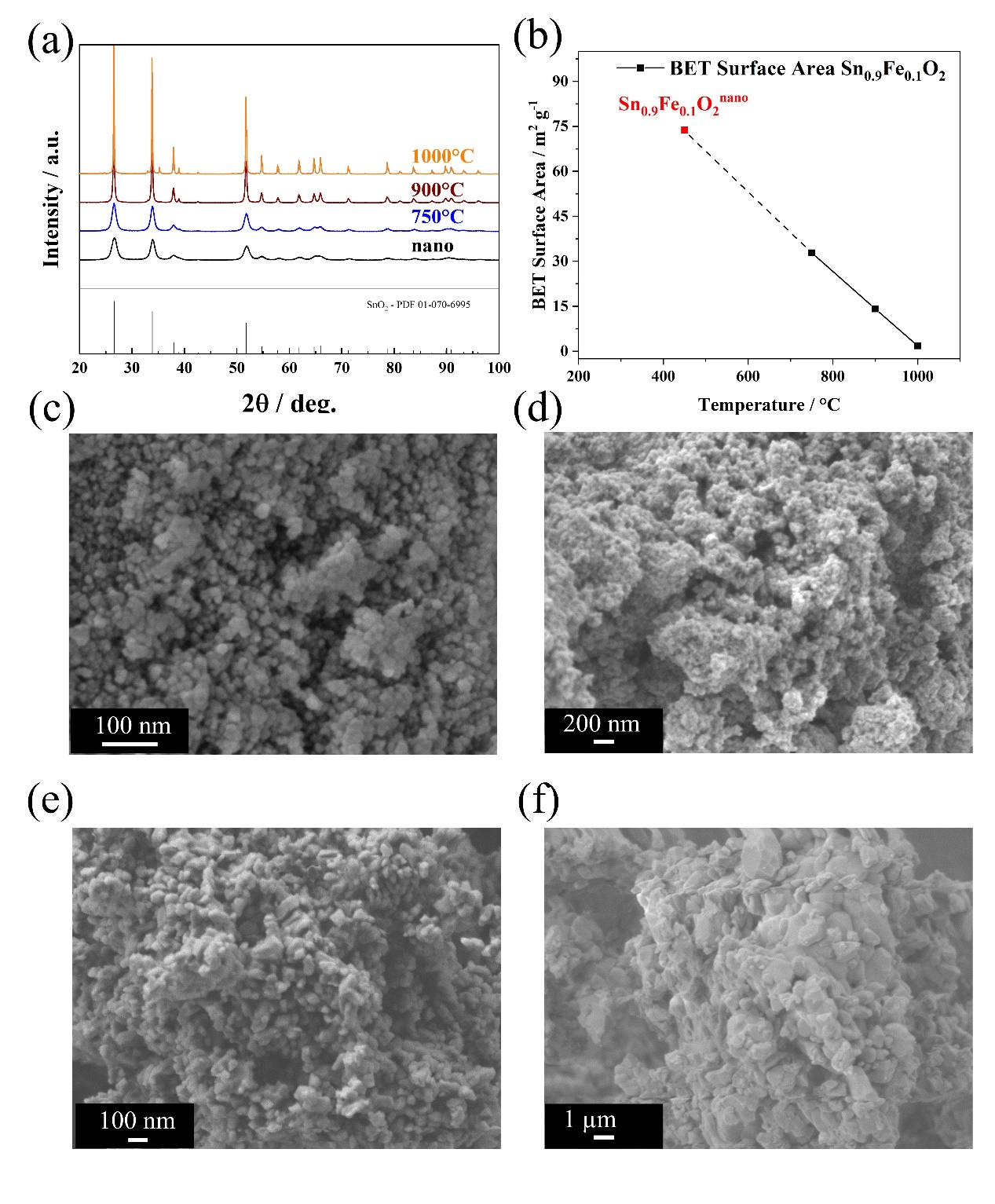
**Figure S1.** Thermogravimetric analysis (TGA) of the carbon-coated Zn0.9Co0.1O samples under oxygen atmosphere.



**Figure S2.** (a-d) SEM micrographs of (a) Zn0.9Co0.1Onano-C, (b) Zn0.9Co0.1O-750-C, (c) Zn0.9Co0.1O-900-C, and (d) Zn0.9Co0.1O-1000-C. (e) Comparison of the XRD patterns recorded for the four samples with the PDF reference 01-071-6424 for wurtzite ZnO given in the bottom.



**Figure S3.** Electrochemical characterization of carbon-coated Zn0.9C0.1O with different particle sizes in half-cells (cut-off voltages: 0.01 and 3.0 V): (a) The dis-/charge profiles for the first cycle at C/20 (50 mA g‑1) with Zn0.9Co0.1Onano-C in black, Zn0.9Co0.1O-750-C in red, Zn0.9Co0.1O-900-C in blue, and Zn0.9Co0.1O-1000-C in green; (b) the dis-/charge profiles for the second cycle at C/5 (200 mA g-1);



**Figure S4.** (a) Comparison of the XRD patterns for Sn0.9Fe0.1O2nano (in black), Sn0.9Fe0.1O2-750 (in blue), Sn0.9Fe0.1O2-900 (in brown), and Sn0.9Fe0.1O2-1000 (in orange) with the PDF reference 01-070-6995 for cassiterite SnO2 given in the bottom. (b) Comparison of the BET specific surface area for these samples. (c‑f) SEM micrographs of (c) Sn0.9Fe0.1O2nano, (d) Sn0.9Fe0.1O2‑750, (e) Sn0.9Fe0.1O2-900, and (f) Sn0.9Fe0.1O2-1000.