

## Press release



### Tools for nano scientists

## Particle characterization of energy storage materials with analytical centrifugation on the way to a successful energy transition

Berlin, 14 November 2024:

CENIDE is a research center representing the main research area "Nanoscience" of the University of Duisburg-Essen. The experience of more than 85 working groups spreads across our six research areas [1].

This year, CENIDE is once again honouring young researchers with the "CENIDE Best Paper Award". The nominated papers must be published in an international peer-reviewed journal in 2023 or 2024 and must not have already been awarded the "CENIDE Best Paper Award" [2].

The paper "Key Control Characteristics of Carbon Black Materials for Fuel Cells and Batteries for a Standardized Characterization of Surface Properties" by Amin Said Amin et al., published as open access in Particle and Particle Systems Characterization, (Early View), [3], won the CENIDE Best Paper Award 2024. LUM GmbH warmly congratulates.

First author Amin presented partial results in June at the International Conference for Dispersion Analysis & Materials Testing (ICDAMT 2024, Berlin) and was honoured there as the best young scientist with the Young Scientist Award 2024 from LUM GmbH [4].

The Key Control Characteristics (KCCs) include physicochemical features like electrical conductivity (electron transport through the catalyst layer, CL), oxygen-containing surface groups (hydrophilicity/hydrophobicity of the CL, catalyst functionalization), surface basicity/acidity, ionomer adsorption, and particle dispersibility (catalyst ink stability). KCCs are determined by particle bulk electrical conductivity, Boehm titration (BT), isoelectric point (IEP), and Hansen solubility parameters (HSP). HSP, understood as similarity parameters for particles, indicate how nanoparticle surfaces interact with liquids during dispersion. The proposed KCCs serve as a starting point for characterizing CBs and guiding product design to obtain meaningful structure-property relationships, essential for a successful energy transition [3].

In the award-winning publication, the authors illustrate the potential and successful application of analytical centrifugation for particle surface characterization (HSP determination), technically implemented in the LUMiSizer® dispersion analyser. The results are an important basis for a current standardization project within the International

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Electrotechnical Commission IEC/TC 113 (Nanotechnology for electrotechnical products and systems) [5].

[1] <https://www.uni-due.de/cenide/en/> 11 Nov 2024 17:48

[2] <https://www.uni-due.de/cenide/de/news-detail.php?id=cenide-best-paper-award-2024>  
7 Nov 2024 12:05

[3] <https://onlinelibrary.wiley.com/doi/full/10.1002/ppsc.202400069> 7 Nov 2024 12:05

[4] <https://www.adlershof.de/en/news/lum-wissenschaftspreis-young-scientist-award-2024-verliehen> 11 Nov 2024 17:50

[5] [https://www.iec.ch/dyn/www/f?p=103:7:::::FSP\\_ORG\\_ID:1315](https://www.iec.ch/dyn/www/f?p=103:7:::::FSP_ORG_ID:1315) 11 Nov 2024 13:53

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