

lädt ein

gemeinsam mit der Gesellschaft
Deutscher Chemiker
zum

Vortrag

von Herrn

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Engineering
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***Chalmers University
of Technology***

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um: 09:30 Uhr

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Gäste sind herzlich willkommen!



**„Benign Synthesis
and Structure-
Property
Relationships of
Organic Mixed
Conductors“**

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Benign Synthesis and Structure-Property Relationships of Organic Mixed Conductors

Organic mixed ionic-electronic conductors (OMIECs) are a class of semiconducting materials that are widely studied for application areas ranging from energy technology to wearable electronics and bioelectronics. Many OMIECs are based on conjugated polymers, which offer a promising combination of electrical and mechanical properties but typically require hazardous synthetic routes that are poorly scalable. This talk will explore how direct arylation polymerization can be used for the environmentally benign synthesis of p-type polymers with a state-of-the-art performance.¹ Model thienothiophene based copolymers with oligoether side chains feature a hole mobility as high as $6 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ in organic electrochemical transistors (OECTs)² and an elastic modulus of about 100 MPa. In-situ monitoring of the electrical and mechanical properties will be discussed, which allows to correlate changes in the nanostructure of the OMIEC during oxidation/reduction cycles with variations in mobility and elastic modulus. Overall, materials are presented that combine benign and scalable synthesis with an excellent electrical and mechanical performance.

References:

¹ Kimpel et al., *Sci. Adv.* **2025**, *11*, eadv8168. "Open-Flask, Ambient Temperature Direct Arylation Synthesis of Mixed Ionic-Electronic Conductors"

² Kim et al., *Nature Commun.* **2024**, *15*, 7606. "Small Signal Analysis for the Characterization of Organic Electrochemical Transistors"

