

Date: 20 May 2022  
Ref.: 3.2-21 0149

## Decision on research misconduct

### Decision

The Swedish National Board for Assessment of Research Misconduct (“the Board”) finds [REDACTED]

[REDACTED] not guilty of research misconduct.

### Background

On 15 November 2021, the Board received anonymous allegations of research misconduct. These allegations relate to fabrication of data in the following four articles, published in the years 2018–2021 by researchers at Linköping University and Chalmers University of Technology:

1. [REDACTED] “Complementary Logic Circuits Based on High-Performance n-Type Organic Electrochemical Transistors”, *Advanced Materials* 2018, 30, 1704916.
2. [REDACTED] “A high-conductivity n-type polymeric ink for printed electronics”, *Nature Communications* 12, 2354 (2021).
3. [REDACTED] “Synergistic Effect of Multi-Walled Carbon Nanotubes and Ladder-Type Conjugated Polymers on the Performance of N-Type Organic Electrochemical Transistors”, *Advanced Functional Materials* 2021, 2106447.
4. [REDACTED] “Influence of Molecular Weight on the Organic Electrochemical Transistor Performance of Ladder-Type Conjugated Polymers”, *Advanced Materials* 2022, 34, 2106235.

The complainant alleges that a range of physical measuring data, on viscosity and capacitance, in the polymeric ink (BBL) studied in the four articles, is fabricated. One reason for the allegation is that the results partially differ among the publications, but the complainant also claims to have found the resulting measurements irreproducible. Besides the measurement data reported in all the articles, the complainant also calls

into question results reported in Article 3 regarding the electrical properties of the transistors with geometric variability that are manufactured (printed) with BBL.

All co-authors of the articles have had the opportunity to express their views, in writing, in response to the allegations.

[REDACTED] has submitted a statement that has also been signed by [REDACTED]

[REDACTED] Their opinion is that the suspicions of fabrication entirely lack any foundation, and that it would have been better if the differences in results cited in the allegations had been discussed in a scientific context.

They clarify the fact that the viscosity of BBL is measured to estimate the relative molecular mass of the material. Moreover, they explain that since the BBL was produced at different laboratories and under varying conditions for the various articles, it was to be expected that the properties of the material would diverge to some extent. One reason for this is that the various raw materials used to synthesise BBL differ in terms of purity. Regarding measurements of the capacitance of the material, too, the alleged offenders provide a similar explanation. They clarify the fact that capacitance depends on numerous factors that, in turn, account for the differences in measuring data.

They state that the BBL on which the results reported in Articles 2 and 4 were based is available for further analysis. They have also given the Board access to some raw data that served as the basis for the results in Articles 1, 3 and 4. Finally, they also explain the background to the results in Article 3 that were called into question by the complainant.

[REDACTED] has submitted a statement of his own. He explains that he took part in the work for Article 2, where his contribution related to aspects other than those concerned in the allegations. He expresses great confidence in his fellow authors and states his view that the allegations are groundless.

[REDACTED], too, has submitted a statement of his own. In it, he clarifies his role as third author of Article 1, and declares that his work for this article does not involve the parts referred to in the allegations. He points out that he has seen no reason to suspect research misconduct in the project.

[REDACTED] has subsequently added to the co-authors' joint communication a statement by an independent expert<sup>1</sup> appointed by Linköping University who, after examining the material in the allegations, rejects any suspicion of research misconduct.

[REDACTED] has submitted a supplementary statement. He clarifies the fact that he took part in the work on all four articles. He relates that he contributed to the design of the projects and to the task of composing the articles.

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<sup>1</sup> Professor Ullrich Scherf, University of Wuppertal, North Rhine-Westphalia, Germany.

██████████ has submitted a supplementary statement. He clarifies the fact that he took part in the work on Articles 2 and 3. He states that he was not directly involved in the parts of the work to which the allegations relate, but he thinks the complainant's issues should have been raised in a different context and that evidence for the suspicions is lacking.

██████████ has submitted a supplementary statement in which she explains that her role in the projects was to be in charge of collection and analysis of data from atomic force microscopy (AFM) in Article 2.

██████████ has had the opportunity to submit a statement in the case, but refrained from doing so.

██████████ has submitted a supplementary statement. He clarifies the fact that he took part in the work for Article 2, and in parts of it that do not relate to the matters referred to in the allegations. He expresses full confidence in his fellow authors, and rejects the allegations of misconduct.

██████████ has submitted a supplementary statement in which she explains that she did not participate in the work on Articles 1 and 3. For Article 2, she made a certain contribution to the experiments. For Article 4, she contributed to the experiments to some extent. For Article 4, she is the first author; her role was a leading one and she took part in every aspect of the work.

██████████ submitted a supplementary statement in which he states that he merely took part in work on Article 2, and that the allegations of fabrication are entirely groundless.

██████████ submitted a supplementary statement in which he explains that he did not participate in the work on Article 1; that he bore the main responsibility for Article 2; that he had limited responsibility for Article 3; and that he took part in most aspects of the work on Article 4, in which he also shared primary responsibility jointly with the first author, ██████████.

The Board has obtained an expert statement in the case. The assessment of this expert<sup>2</sup> is that in the material belonging to the case, there is nothing to indicate the occurrence of any form of research conduct. He confirms the explanations given in the alleged offenders' joint statement regarding their view that the differences found among the various results reported in the four articles provide no reasons for suspicions of data fabrication. Instead, these differences were to be expected. He is also of the opinion that the alleged offenders have answered the allegations thoroughly and convincingly.

The alleged offenders have received the expert statement. ██████████ submitted a statement that was also signed by ██████████

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<sup>2</sup> Professor Federico Rosei, INRS, University of Quebec, Canada.



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The Board has decided in this case following a presentation by caseworker Sofia Ramstedt.

Thomas Bull  
Chair

Sofia Ramstedt  
Caseworker