

Supervisor's opinion on the Ph.D. thesis
"Preparation and characterisation of nanostructured materials
for electronic gas sensor devices"

written by

David J. Dmonte

submitted to the

Tomas Bata University in Zlín

David J. Dmonte, MSc., studied the Ph.D. programme 'Nanotechnology and Advanced Materials' at Tomas Bata University in Zlín, Czech Republic. Within his studies, he has fulfilled all duties connected with the study programme and successfully passed the state doctoral exam. His dissertation work is focused on the preparation and characterisation of new nanostructured materials as transducers for electronic gas sensor devices, specifically chemiresistive sensors of various gases, with the intention of surpassing state-of-the-art in their sensitivity. Within the first part of his work, the simple ZnO nano forest-based sensor did not succeed much in ethanol vapour sensing, but there was a contribution in the methodological advance in material printing and hydrothermal synthesis of the material. In contrast to that, simple synthesis and material deposition methods were chosen for the work on the other sensors made from bismuth ferrite and chromium vanadate, which resulted in sensors exhibiting reasonable sensitivity, selectivity, and response repeatability towards NO₂ as a representative electron-withdrawing gas and NH₃ as a representative electron-donating gas, respectively. The sensors provide better or at least comparable sensitivity in comparison with contemporary devices reported by other groups, but they do not need use of noble metals or complicated production techniques.

The dissertation was submitted as a monograph. However, its core findings were embodied in two publications in impacted journals, the first in *Micromachines* and the second in the journal *Sensors and Actuators B: Chemical*, where David contributed as the first author. David is also a co-author of another paper in *Polymers*.

David Dmonte presented his results at an international conference. He also spent seven months abroad at the University of Cologne, Department of Inorganic Chemistry, under the guidance of Professor Sanjay Mathur. As a supervisor, I thank him for his invaluable support.

To provide a complete picture, I also confirm that similarity analysis in anti-plagiarism text-checking systems did not indicate plagiarism. If similarity analysis indicates any parts, it must be emphasised that such scores account for the papers with David's own works and results. All indicated texts or figures are appropriately cited.

To summarise, during his study at TBU in Zlín, David Dmonte demonstrated sufficient diligence, knowledge, and effort necessary for the successful fulfilment of the studied Ph.D. programme. With regard to these facts and according to my opinion, the submitted dissertation work is well conceived. I recommend it to be defended, and upon successful defence, David Dmonte will be awarded the Doctor of Philosophy (Ph.D.) degree.

Zlín 20th March 2024

prof. Ing. et Ing. Ivo Kuřitka, Ph.D. et Ph.D.

Supervisor