Xiao LI

Doctor in Materials Science

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* Web of Science Researcher ID: LGZ-4299-2024

PROFILE

"*Novel materials and more sustainable processing for a greener world*" has always been my motivation. As a strong-willed and persistent person, I seek to continue research on thin films while seeking a deeper understanding and enabling broadening applications.

PROFESSION

PVD (HiPIMS, DCMS), Plasma diagnostics, Low temperature film deposition, Ceramics materials, Transition metal nitrides and oxides, Multi-functional thin films, thermoelectrics.

LANGUAGES

* Chinese (native)
* English (proficiency)
* German (basic)

WORK EXPERIENCE

Institute of Physics of the Czech Academy of Sciences (FZU)
Prague, Czech Republic 2024.09.02-
Postdoctoral fellowship funded by Marie Skłodowska-Curie Actions (MSCA) under Physics for Future (P4F) project
Supervisor: Mgr. Zdeněk Hubička

EDUCATION

Linköping University,
Linköping, Sweden 2019.08.01-2023.10.31
Ph.D. in Materials Science 2023.09.01
Supervisor: Prof. Grzegorz Greczynski
Co-supervisor: Prof. Lars Hultman

Southwest Jiaotong University,
Chengdu, China 2016.09-2019.06
M.E. in Materials Science and Engineering

Huazhong University of Science and Technology,
Wuhan, China 2011.09-2015.06
B.E. in Functional Materials
B.A. Minor in German

SKILLS & TECHNIQUES

Thin film deposition techniques: HiPIMS, DCMS
Plasma diagnostics: ion mass spectrometry
Mechanical property test: nanoindentation, stress measurement
Phase, morphology, and composition analysis: XRD, EDX, SEM, XPS, TEM, DSC/TGA
Thermoelectrical test: four-probe method, laser flash method
Ceramics processing, sol-gel synthesis, powder sintering
Data analysis: Origin
Computational simulation: TRIM

RESEARCH CONTRIBUTIONS

Scientific Publications:

* 9 papers published: 5 Papers as first author, 2 papers as second author, 2 papers as co-authors.

International conferencs:

* 49th International Conference on Metallurgical Coatings and Thin Films (ICMCTF)
San Diego, US 2023.05
Talk: "*Toward energy-efficient physical vapor deposition: Routes for densification of* $(Ti_{1-y}Al_y)_{1-x}W_xN$ *thin films grown with no external heating*".
* Reactive Sputter Deposition Conference 2022.12
Talk: *"Low temperature deposition of* $(Ti_{1-y}Al_y)_{1-x}W_xN$ *thin films by hybrid HiPIMS/DCMS".*

Industrial collaboration:

SECO Tools 2020.08-2023.06
Cutting performance of WC-Co inserts with protective TiAlWN coatings

Honor: Travel grant of 30000 kr from Åforsk (Sweden) for the 49th ICMCTF conference in 2023

Study visit:

Materials Chemistry, RWTH Aachen, Germany 2022.11
Growth of CrWN and CrAlWN films by HiPIMS/DCMS with no external heating

REFERENCES

Professor Lars Hultman
Head (leave of absence) Thin Film Physics Division, Linköping University, Sweden
CEO Swedish Foundation for Strategic Research
Elected member Swedish Royal Academy of Science, KVA
ERC Grantee. ISI h-index = 90.

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Professor Grzegorz Greczynski
Head of Thin Film Physics Unit, Thin Film Physics Division, Linköping University, Sweden

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PUBLICATION LIST

1. Doctoral thesis
X. Li, "*Toward Energy-efficient Physical Vapor Deposition: Routes for Replacing Substrate Heating during Magnetron Sputtering by Employing Metal Ion Irradiation*", ISBN 978-91-8075-242-8, ISSN 0345-7524. https://doi.org/10.3384/9789180752428.

2. O.V. Pshyk, **X. Li**, I. Petrov, D.G. Sangiovanni, J. Palisaitis, L. Hultman, G. Greczynski, *Acta Materialia*, 255 (2023) 119105.
"*Discovery of Guinier-Preston zone hardening in refractory nitride ceramics*".
https://doi.org/10.1016/j.actamat.2023.119105.

3. **X. Li**, I. Petrov, L. Hultman, G. Greczynski, *Journal of Vacuum Science & Technology A,* 41 (2023) 013407.
"*Determining role of W^+ ions in the densification of TiAlWN thin films grown by hybrid HiPIMS/DCMS technique with no external heating*". https://doi.org/10.1116/6.0002320.

4. **X. Li**, B. Bakhit, M.P. Johansson Jõesaar, I. Petrov, L. Hultman, G. Greczynski, *Scientific Reports*, 12 (2022) 2166.
"*Dense, single-phase, hard, and stress-free $Ti_{0.32}Al_{0.63}W_{0.05}N$ films grown by magnetron sputtering with dramatically reduced energy consumption*". https://doi.org/10.1038/s41598-022-05975-5.

5. **X. Li**, B. Bakhit, M.P. Johansson Jõesaar, I. Petrov, L. Hultman, G. Greczynski, *Surface & Coatings Technology*, 424 (2021) 127639.
"*Towards energy-efficient physical vapor deposition: Mapping out the effects of W^+ energy and concentration on the densification of TiAlWN thin films grown with no external heating*".
https://doi.org/10.1016/j.surfcoat.2021.127639.

6. **X. Li**, B. Bakhit, M.P. Johansson Jõesaar, L. Hultman, I. Petrov, G. Greczynski, *Surface & Coatings Technology*, 415 (2021) 127120.
"*Toward energy-efficient physical vapor deposition: Routes for replacing substrate heating during magnetron sputter deposition by employing metal ion irradiation*".
https://doi.org/10.1016/j.surfcoat.2021.127120.

7. B. Vicher, O. V. Pshyk, **X. Li**, B. Bakhit, V. Rogoz, I. Petrov, L. Hultman, G. Greczynski, *Materials & Design*, 238 (2024) 112727.
"*Superhard oxidation-resistant $Ti_{1-x}Al_xB_y$ thin films grown by hybrid HiPIMS/DCMS co-sputtering diboride targets without external substrate heating*". https://doi.org/10.1016/j.matdes.2024.112727.

8. V. Šroba, K. Viskupová, B. Wicher, V. Rogoz, **X. Li**, M. Mikula, G. Greczynski, *Journal of Vacuum Science & Technology A*, 42 (2024) 023410.
"*Cross-ionization of the sputtered flux during hybrid high power impulse/direct-current magnetron co-sputtering*". https://doi.org/10.1116/6.0003258.

9. D.G. Liu, **X. Li**, F.Z. Liu, J.L. Liu, Y. Gao, K. Ren, Y.G. Wang, *Journal of Alloys and Compounds*, 825 (2020) 154061.

"*Effect of the current density on the densification of 3 mol% yttria-stabilized zirconia in flash sintering*". https://doi.org/10.1016/j.jallcom.2020.154061.

10. **X. Li**, J.J. Wu, S.J. Huang, Y. Gao, D.G. Liu, J.L. Liu, H.T. Lin, *Journal of Materials Research and Technology,* 28 (2024) 3475-3484.
"*Enhancing thermoelectric properties of $Ca_3Co_4O_9$ ceramics through oscillatory pressure sintering*". https://doi.org/10.1016/j.jmrt.2023.12.256.