Correspondence address: Institute of Metallurgy and Materials Science, Polish Academy of Sciences, 30-059 Kraków, Reymonta Street 25

Phone.: (012) 295 28 16, room 216, Fax: (012) 295 28 04

e-mail: a.debski@imim.pl

ORCID: http://orcid.org/0000-0002-1371-0269

Employment and positions

Institute of Metallurgy and Materials Science, Polish Academy of Sciences, research associate (from 2005-2012), assistant professor (2013-2017), associate professor (2017-).

Prof. Adam Dębski, PhD, DSc, has been employed at the Institute of Metallurgy and Materials Science of the Polish Academy of Sciences in Krakow since 2003, initially as a mechanic (since 2003), assistant (since 2005), assistant professor (since 2013), and then associate professor (since July 2017).
From 2005 to 2014, he served as an expert in the Research Laboratories Group accredited by the Polish Accreditation Center at the Institute of Metallurgy and Materials Science of the Polish Academy of Sciences -- the L-6 Spectral Chemical Analysis Laboratory.
Since 2013, he has served as Head of the L-8 Physicochemical Research Laboratory at the Institute of Metallurgy and Materials Science of the Polish Academy of Sciences.
From 2019 to 2022 and from 2024 to 2026, he served as Secretary of the Scientific Council of

the Institute of Metallurgy and Materials Science of the Polish Academy of Sciences.

Scientific Career

M.Sc.: Cracow University of Technology, 2003

Ph.D.: Institute of Metallurgy and Materials Science, Polish Academy of Sciences, 2013.

D.Sc. - Institute of Metallurgy and Materials Science, Polish Academy of Sciences, 2017.

Prof.: President of the Republic of Poland, Scientific title, 19.06.2026.

Scientific achievements

150 papers, among them: **118** papers in reference to journals cited by the Institute for Scientific Information in Philadephia and 3 monographs

The most relevant publications during last 5 years

1.

M. Birare, **A. Dębski**, W. Gąsior, W. Gierlotka, Defect Thermodynamics and the Intrinsic Stability Window of Mg_3Sb_2, Metals, 16, (2026), 558.

2.

W. Gozdur, W. Gierlotka, M. Bieda, W. Gąsior, A. Budziak, M. Polański, M. Pęska, **A. Dębski**, Experimental and Theoretical Investigation of the κ-Phase (Ag2Mg5) in the Ag-Mg System, Materials, 19(11), (2026), 2241.

3.

W. Gozdur, W. Gąsior, W. Gierlotka, M. Pęska, M. Polański, **A. Dębski**, Investigation of liquid alloys from the ternary Cu-Mg-Ti system: calorimetric study and thermodynamic modeling, Applied Sciences, 16, (2026), 262.

4.

W. Gozdur, W. Gierlotka, W. Gąsior, M. Bieda, A. Góral, A. Budziak, M. Pęska, **A. Dębski**, The Copper-Magnesium system - calorimetric studies and phase diagram calculations, Journal of Magnesium and Alloys, 15, (2026), 101880.

5.

R. Dębski, W. Gąsior, W. Gierlotka and **A. Dębski**, Uncertainty-Aware Prediction of Mixing Enthalpy in Binary Alloys with Symmetry-Augmented Embeddings, Symmetry, 17, (2025), 1282.

6.

R. Dębski, W. Gąsior, W. Gierlotka and **A. Dębski**, Uncertainty-Aware Design of High-Entropy Alloys via Ensemble Thermodynamic Modeling and Search Space Pruning, Applied Sciences, 15, (2025), 8991.

7.

W. Gozdur, W. Gierlotka, W. Gąsior, A. Wierzbicka-Miernik, T. Czeppe, A. Budziak, A. Radziwonko, M. Pęska, **A. Dębski**, Calorimetric studies of the silver-titanium system, Molecules, 30, (2025), 3898.

8.

A. Pajdak, **A. Dębski**, M. Kudasik, N. Skoczylas, W. Maziarz, W. Gąsior, Thermal effects accompanying hydrogen accumulation in carbon and coal structures, Archives of Mining Sciences, 70 (2025), 4, 575-596.

9.

M. Peska, **A. Dębski**, W. Gąsior, S. Dyjak, W. Gierlotka, A. Baran, D. J. Zasada, M. Polanski, Hydrogenation Behavior of Mg-Li Alloys, ACS Applied Energy Materials, 8, (2025), 1994-2002.

10.

W. Gierlotka, **A. Dębski**, W. Gąsior, R. Dębski, M. Pęska, M. Polański, Application of the OpenCalphad software to optimization of the Au-Mg system, Calphad, 89, (2025), 102835.

11.

W. Gierlotka, **A. Dębski**, W. Gąsior, Magnesium alloys explored: Theoretical insights into the Ir-Mg alloy materials' genome, MRS Communications, 15, (2025), 271-278.

12.

W. Gierlotka, **A. Dębski**, W. Gąsior, Thermodynamics of point defects in the AlSb phase and its influence on phase equilibrium, Computational Materials Science, 256, (2025), 113934.

13.

W. Gierlotka, W. Gozdur, W. Gąsior, M. Pęska, M. Polański, **A. Dębski**, On the Cu-Ti system: Ab initio calculations, calorimetric studies and phase diagram, Journal of Alloys and Compounds, 1036, (2025), 181749.

14.

A. Dębski, M. Pęska, S. Terlicka, J. Dworecka-Wójcik, W. Gąsior, W. Gierlotka, A. Budziak and M. Polański, Calorimetric Studies of the Mg-Pt System, Materials 18, (2025), 3075.

15.

A. Dębski, M. Pęska, J. Dworecka-Wójcik, W. Gąsior, W. Gierlotka, R. Chulist, R. Cerny, I. Wyrębska, S. Terlicka, M. Polański, Mechanical synthesis and calorimetric studies of the enthalpies of formation of chosen Mg-Pd alloys, Molecules, 29, (2024), 5734.

16.

W. Gozdur, W. Gąsior, M. Zrobek, A. Budziak, R. Dębski, W. Gierlotka, M. Pęska, M. Polański, **A. Dębski**, Calorimetric Studies and Thermodynamic Modeling of Ag-Mg-Ti Liquid Alloys, Materials, 17, (2024), 1786.

17.

W. Gierlotka, S. Terlicka, W. Gąsior, **A. Dębski**, M. Pęska, M. Polański, Electrochemical investigation and thermodynamic assessment of the Mg-Pd system, Journal of Mining and Metallurgy, Section B: Metallurgy, 60, (2024), 105-116.

18.

A. Dębski, W. Gąsior, W. Gierlotka, M. Polański, Calorimetric studies and thermodynamic modelling of liquid Mg-Pb-Pd alloys, Journal of Molecular Liquids, 371 (2023) 121123.

19.

C.-Y. Liu, Y.-Y. Liu, S.-H. Chen, S.-W. Chen, **A. Dębski**, W. Gąsior, W. Gierlotka, Thermodynamic modeling of the Sb-Te system supported by DSC measurement and ab initio calculations, Journal of Materials Research, 38, (2023), 4287-4302.

20.

A. Dębski, S. Terlicka, M. Pęska, A. Bigos, W. Gąsior, W. Gierlotka, M. Polański, Mechanical synthesis of Mg6Pd1-xAgx alloys and their hydrogen absorption capability, Journal of Alloys and Compounds, 957 (2023), 170396.

21.

A. Dębski, W. Gąsior, W. Gierlotka, A. Baran, M. Polański, The magnesium-palladium-silver system: thermodynamic properties of the liquid phase, Journal of Mining and Metallurgy, Section B: Metallurgy, 59(2), (2023), 183-193.

22.

W. Gierlotka, **A. Dębski**, W. Gąsior, M. Polański, Computational approach to the Ag-Ti system, Computational Materials Science, 230, (2023), 112519.

23.

A. Dębski, W. Gierlotka, M. Zabrocki, A. Góral, W. Gąsior, Thermodynamic measurements and ab initio calculations of the indium-lithium system, Journal of Mining and Metallurgy, Section B: Metallurgy, 59(3), (2023), 407-420.

24.

W. Gierlotka, **A. Dębski**, M. Zabrocki, A. Góral, W. Gąsior, Phase diagram, thermodynamic studies, and ab-initio calculations of the Ge-Li system, The Journal of Chemical Thermodynamics, 175 (2022) 106883.

25.

A. Dębski, W. Gąsior, W. Gierlotka, M. Polański, Mixing enthalpies of liquid Ag-Mg-Pb alloys: experiment vs. thermodynamic modeling, Materials, 371 (2022) 121123.

26.

A. Dębski, W. Gierlotka, W. Gąsior, Calorimetric studies and thermodynamic calculations of the Ag-Mg system, Journal of Alloys and Compounds, 891 (2022) 161937.

27.

W. Gierlotka, W. Gąsior, **A. Dębski**, M. Zabrocki, Thermodynamic modelling of the binary indium-lithium system, a promising Li-ion battery material, Journal of Mining and Metallurgy, Section B: Metallurgy, 58 (1) (2022) 74-84.

28.

A. Dębski, S. Terlicka, A. Sypien, W. Gąsior, M. Pęska, M. Polański, Hydrogen Sorption Behavior of Cast Ag-Mg Alloys, Materials, 15(1) (2022) 270.

29.

M. Rzeszotarska, J. Dworecka-Wójcik, **A. Dębski**, T. Czujko, and M. Polański, Magnesium-based complex hydride mixtures synthesized from stainless steel and magnesium hydride with subambient temperature hydrogen absorption capability, Journal of Alloys and Compounds, 901 (2022) 163489.

30.

M. Saternus, A. Fornalczyk, W. Gąsior, **A. Dębski**, S. Terlicka, S. Golak and P. Ciepliński, Modeling of the flow in the process of washing out automotive catalyst carriers with the PbLi alloy, Materials 15 (2022) 3119.

31.

W. Gierlotka, **A. Dębski**, S. Terlicka, W. Gąsior, M. Pęska, J. Dworecka-Wójcik, M. Polański, Theoretical studies of the thermodynamic and mechanical properties of Mg-Pt system. An insight into phase equilibria, Journal of Materials Research, 37 (2022) 1904-1915.

32.

A. Dębski, M. Pęska, J. Dworecka-Wójcik, S. Terlicka, W. Gąsior, W. Gierlotka, M. Polański, Structural and calorimetric studies of magnesium-rich Mg-Pd alloys, Journal of Alloys and Compounds, 858 (2021) 158085.

33.

S. Kulawik, W. Gierlotka, **A. Dębski**, W. Gąsior, A. Zajączkowski, Calorimetric and phase diagram studies of the Ga-In-Zn system, Journal of Molecular Liquids, 325 (2021) 115114.

34.

A. Dębski, W. Gierlotka, S. Terlicka, W. Gąsior, On the Mg-Pb system. Calorimetric studies and thermodynamic calculations, Journal of Alloys and Compounds, 861 (2021) 158396.

35.

W. Gierlotka, **A. Dębski**, S. Terlicka, W. Gąsior, M. Pęska, M. Polański, I.T. Lin, Insight into phase stability in the Mg - Pt system. The ab initio calculations, Journal of Phase Equilibria and Diffusion, 42 (2021) 102-106.

36.

A. Dębski, S. Terlicka, W. Gąsior, W. Gierlotka, M. Pęska, J. Dworecka-Wójcik, M. Polański, Calorimetric studies of magnesium-rich Mg-Pd alloys, Materials, 14(3) (2021) 680.

37.

W. Gierlotka, I-T Lin, S.-W Chen, W. Gąsior, **A. Dębski**, Re-optimization of the binary Sb - Se system aided by ab-initio calculation, Calphad, 73 (2021) 102257.

38.

S. Terlicka, **A. Dębski**, M. Saternus, A. Fornalczyk, W. Gąsior, Experimental results of the Li-Pb-Pt system obtained by the high temperature drop calorimetry, Journal of Molecular Liquids, 332 (2021) 115824.

39.

M. Zabrocki, W. Gąsior, **A. Dębski**, Thermodynamic properties of Ga-In-Li alloys - a potential material for liquid metal batteries, Journal of Molecular Liquids, 332 (2021) 115765.

40.

A. Dębski, S. Terlicka, M. Saternus, A. Fornalczyk, W. Gąsior, Calorimetric studies and thermodynamic properties of Li-Pb-Pd liquid alloys, Journal of Molecular Liquids, 339 (2021) 116791.

41.

M. Pęska, K. Smektalska, J. Dworecka-Wójcik, S. Terlicka, W. Gąsior, W. Gierlotka, **A. Dębski**, M. Polański, Hydrogen sorption behavior of mechanically synthesized Mg-Ag alloys, International Journal of Hydrogen Energy, 46(66), (2021) 33152-33163.

42.

S. Terlicka, **A. Dębski**, A. Sypien, W. Gąsior, A. Budziak, Determination of thermophysical and thermodynamic properties of Ag-Mg alloys, Materials Today Communications, 29 (2021) 102946.

Research Projects

Projects from Ministry of Science and Higher Education

-

Thermodynamic properties and structure of Cu-Mg-Ti and Ag-Mg-Ti alloys and their potential for hydrogen interaction, (Project No. 2021/43/O/ST8/01291), IMMS PAS, supervisor, 2023-2027.

-

Thermodynamic properties of alloys from Mg-Pd and Mg-Pt systems, (Project No. 2018/31/B/ST8/01371), IMMS PAS-MUT, supervisor, 2019-2022.

-

Influence of lithium concentration in Pb-Li alloys on wettability and efficiency of metal extraction from thin catalytic layers in porous ceramic capillaries. Research, modeling, (Project No. 2017/27/B/ST8/01464), IMMS PAS, participant, 2018-2021.

-

Thermodynamic properties and structure alloys from the Ga-In-Li system, (Project No. 2016/21/B/ST8/01031), IMMS PAS, participant, 2017-2020.

-

Thermodynamic characterization of the Ga-Li system, (Project No. 2014/13/D/ST8/03147), IMMS PAS, supervisor, 2015-2018.

-

Thermodynamic studies of Ag-Li alloys as a material for safe storage of hydrogen, (Project No. IP2012035572), IMMS PAS, supervisor, 2013-2015.

-

Thermodynamic properties and phase diagram of Ag-Bi-Cu alloys, (Project No. IP2011 012571), IMMS PAS, participant, 2012-2014.

-

Thermodynamics of alloys for safe hydrogen storage and energy, IMMS PAS, supervisor, 2012-2014.

-

Thermodynamic properties and phase diagrams of Be-B and Be-Li alloys as materials for safe hydrogen storage, (Project No. 2011/01/D/ST8/01630), IMMS PAS, participant 2011-2014.

-

Thermodynamic research on Li-Si alloys as a material for safe storage of hydrogen, (Project No. IP2010007170), IMMS PAS, supervisor, 2010-2011.

-

Thermodynamic properties of Ca-Li alloys as a material to safe hydrogen storage, (Project No. N N508379235), IMMS PAS, participant, 2008-2011.

-

Phase equilibria in the Bi-In-Sn-Zn system. (Project No. N N507 457237), IMMS PAS, participant, 2009-2012.

-

Development to SURADT database using measurements of viscosity and evaluation of wettability of Pb- free solders on Cu substrate, (Project No. 4582/BT08/2007/33), IMMS PAS, participant, 2007-2010.

European Union Projects

-

COST, Action 535 - *Thermodynamics of alloyed aluminides (Thalu)*, Project: Production and optimalization of intermetalics properties, IMMS PAS, participant, 2004-2007.

-

COST, Action MP 0602- *Advanced solder materials for high temperature applications - HISOLD* , Project: Complex study of thermodynamic and physico-chemical properties and structural characteristics of materials for potential use as high-temperature lead-free solders, IMMS PAS, participant, 2007-2010.

-

Advanced materials and technologies for their production, IMIM PAN, participant, 2010-2013.

-

Adaptation of the research potential of IMMS PAS to the requirements of global standards for comprehensive research in the field of materials science, (Project POIG.02.01.00-12-175/09), IMMS PAS, participant, 2011-2014

Prizes and awards:

2023 - Third place in the overall ranking of research achievements of IMMS PAS employees for 2021-2022.

2022 - Silver Cross of Merit for overall research and scientific achievements.

2017 - IMMS PAS Director Award for fifth place in the group of young researchers in the evaluation of scientific research achievements for 2015-2016.

2015 - IMMS PAS Director Award for third place in the group of young researchers in the evaluation of scientific research achievements for 2013-2014.

2013 - IMMS PAS Director Award for first place in the group of young researchers in the evaluation of scientific research achievements for 2011-2012.

2013 - Ph.D. with honour.

2010 Special remark in Who's Who in Science and Engineering 2011-2012 (11th Edition).

Education of scientific staff

-

Doctoral thesis supervisor of Weronika Gozdur, M.Sc. Eng. Dissertation topic: Thermodynamic Properties and Structure of Cu-Mg-Ti and Ag-Mg-Ti Alloys and Their Potential for Interaction with Hydrogen. Co-supervisor: Magda Pęska, Ph.D., Eng. (Military University of Technology, WAT). Doctoral proceedings initiated: November 16, 2023.

-

2019-2023 - Co-supervisor of Magda Pęska, M.Sc. Eng. Dissertation topic: Synthesis of Selected Magnesium-Based Alloys and Their Properties in Terms of Hydrogen Interaction. Dissertation defended in 2023.

-

2019-2023 - Doctoral thesis supervisor of Sebastian Kulawik, M.Sc. Eng. Dissertation topic: Thermodynamic Properties of Liquid Ga-Sn-Zn and Ga-In-Zn Alloys. Co-supervisor: Andrzej Zajączkowski, Ph.D., Eng. (Institute of Non-Ferrous Metals, IMN). Dissertation defended in 2023.

-

2019 - Care for trainee MUT, Magda Pęska.

-

2018 - Care for trainee AGH, Emil Broszkiewicz.

-

2018 - Care for trainee AGH, Magdalena Bork.

-

2017 - Care for trainee AGH, Karolina Kunicka.

-

2017 - Care for trainee WUT, Dominika Maciocha.

-

2015 - Care for trainee JU Marta Mamełka.

-

2014-2015 - Supervisor of master of science thesis inż Katarzyna Szmit; " The thermodynamic studies of selected properties of alloys of Al-Li-Zn system".

-

2014 - Care for trainee AGH Katarzyna Kurek.

-

2013 - Care for trainee AGH Katarzyna Szmit.

Reviewer

Journal of Alloys and Compounds.

Membership in professional societies

Member - Associated Phase Diagram and Thermodynamics Committee.

Main scientific interest

Multicomponent alloys, intermetallic phases, calorimetry, hydrogen storage, physicochemical properties of lead-free solders.