

October, 2022

CURRICULUM VITAE AND LIST OF PUBLICATIONS

Personal Details

Michael Zinigrad

Date and place of birth: 24.06.1945, Bistry Istok, Altay, Russia (former USSR)

Date of immigration: 25.07.1992

Telephone number at work: (972) 3 9066217

Telephone number at home: 054-7776413

Education

Undergraduate and Graduate Studies

- D.Sc. 1982, USSR Academy of Science, Institute of Metallurgy, Sverdlovsk,
Kinetics and mechanism of the interaction of sulfide-metal and oxide melts.
- Ph.D. 1972, USSR Academy of Science, Institute of Electro-chemistry, Sverdlovsk,
Analysis of kinetic of sulfide sulfur oxidation by slags.
- B.Sc.&M.Sc. 1968, Dnepropetrovsk Metallurgical Institute, Ukraine, Dr. Schepetkin.
Synthesis of crystalline structures of some solid solutions.

Academic Ranks and Tenure in Institutes of Higher Education

2008-2020, Ariel University, Rector.

1999- present, Ariel University, Head of the Materials Research Center.

1995-2008, Ariel University, Dean of the Natural Science Faculty.

1993 - present, Ariel University, Chemical Sciences, Chemical Eng., Full Professor.

1988-1991, Urals Polytechnic Institute, Head of the Surfacing Department.

1983-1992, Urals Technical University, Surfacing Department, Professor.

1976-1983, Urals Polytechnic Institute, Surfacing Department, Associated professor.

Professional Activities

Positions in academic administration (Departmental, Faculty and University)

2008-2020, Ariel University, Rector.

1999- present, Ariel University, Head of the Materials Research Center.

1995-2008, Ariel University Center, Dean of the Natural Science Faculty.

1988-1991, Urals Polytechnic Institute, Head of the Surfacing Department.

Professional functions outside universities/institutions (inter-university, national, international)

2009, Member of the International Academy of Science and Higher Education.

1998, Central Iron and Steel Institute, Beijing, China, Visiting Professor.

1997, Urals State Technical University, Sverdlovsk, Russia, Visiting Professor.

2001, Institute of Metallurgy, Russian National Academy of Science, Sverdlovsk, Russia, Visiting Professor.

Editor or member of editorial board of scientific or professional journal

Editorial board member

Coatings by MDPI Journal Topics Board member.

Editorial board *Journal of Metals (High-Temperature Physical Chemistry and Electrochemistry of Melts)*.

Editorial board, *Journal of Ferrous Metals*.

Editorial board, *Journal of Non-Ferrous Metals*.

Editorial board, *The Paton Welding Journal*.

Editorial board, *Journal of Modern Electrometallurgy*.

Membership in professional/scientific societies

2007-2013, Member of the National Committee on Technological Incubators under the Office of the Chief Scientist of Israel's Ministry of Industry, Trade and Labor, Israel.

Membership, American Welding Society (AWS), USA.

Membership, Materials Information Society (ASM International), USA.

Educational activities

Courses taught in Recent Years

1993 – present, Physical Chemistry 1 – Thermodynamics, for B.Sc. students, Ariel University.

1993 – present, Physical Chemistry 2 – Kinetics, for B.Sc. students, Ariel University.

2000 – 2007, Corrosion and Protection Methods, for B.Sc. students, Ariel University (jointly taught).

2009 – 2017, Introduction to Materials Sciences, for B.Sc. students, Ariel University (jointly taught).

2000 – 2008, Modeling of physico-chemical processes, for B.Sc. students, Ariel University.

Master students:

Before aliya (in Russia from 1973 to 1991) – 34;

In Israel:

2006, Konstantin Borodiansky, Ariel University
2008, Maya Radun, Ariel University
2009, Michael Remennik, Ariel University
2013, Barbara Kazansky Ariel University
2014, Sophy Yado, Ariel University
2015, Elvin Hanukaev, Ariel University
2015, Aviad Artum, Ariel University
2020, Israel Wolicky, Ariel University (jointly with Dr. Konstantin Borodianskiy)
2020, Sofiya Rubzova, Ariel University
2022, Oran Shakalo (Dadon), Ariel University (jointly with Dr. Albina Musin)
In process, Avital Shvartz, Ariel University
In process, Mariya Atamna, Ariel University (jointly with Dr. Konstantin Borodianskiy)

Ph.D. students:

In the range of 1980–1991 in Ural State University, Russia:

Larisa Panfilova (Malisheva)

Alexander Phlyagin

Sergey Panov

Elena Belyaeva

Alexey Ryabzev

Viktor Nikitin

Alexey Phephelov

Andrey Timoshin

Andrey Okolzdaev

Nikita Razikov

Alexander Balin

In Israel:

2004, Vladimir Mazurovsky
2009, Alex Lugovskoy, Ariel University (jointly with Prof. Doron Aurach)
2011, Konstantin Borodianskiy, Ariel University (jointly with Prof. Aharon Gedanen)
2014, Alexey Kossenko, Ariel University
2015, Albina Musin, Ariel University
2017, Maya Radun, Ariel University (jointly with Prof. Nahum Frage)
2018, Barbara Kazansky, Ariel University (jointly with Dr. Alex Lugovskoy)
2019, Yelena Rogozin, Ariel University
2020, Kashiap Diwakar, Ariel University
2021, Alexander Sobolev, Ariel University (jointly with Dr. Konstantin Borodianskiy)
2021, Anton Valkov, Ariel University (jointly with Prof. Marina Nisnevitch)
In process, Or Rahumi, Ariel University (jointly with Dr. Konstantin Borodianskiy)
In process, Lev Parfenov, Ariel University (jointly with Dr. Konstantin Borodianskiy)
In process, Mykola Shatalov, Ariel University (jointly with Dr. Albina Musin)
In process, Sofiya Rubzova, Ariel University (jointly with Dr. Albina Musin)
In process, Paulami Murherjee, Ariel University (jointly with Dr. Tomer Zidki)
In process, Zeev Mor Haim, Ariel University (jointly with Prof. Yaakov Bloch)
In process, Aneena Lay, Ariel University (jointly with Dr. Arie Borenstein)

Postdoctoral fellows:

Valentin Shumyakov
Nikolay Zalomov
Svetlana Lugovskoy
Tomer Zidki
Viktor Danchuk
Rath Manasa
R. Ramarajan

Awards, Citations, Honors, Fellowships

2017, Doctor Honoris Causa of Russian Academy of Science.

2017, Honorary Professor of Ushynsky University.

Authored books

Scientific Books (Monographs)

1. V. Boronenkov, **M. Zinigrad**, L. Leontev, E. Pastukhov, M. Shalimov, S. Shanchurov, *Phase Interaction in the Metal—Oxides Melts—Gas System: The Modeling of Structure, Properties and Processes*. Springer, 407p. 2012.
2. V. Boronenkov, **M. Zinigrad**, L. Leontev, E. Pastukhov, M. Shalimov, S. Shanchurov, *Simulation of structure properties and interphase interaction processes in the Metal—Oxides Melts—Gas System*. Ural branch of RAS, 450p. Ekaterinburg, Russia, 2010.

Other Books

Editorship of collective volumes

1. **M. Zinigrad**, A. Kossenko, 2020-2021, Special issue, Functional coating for metallic and ceramic materials (MDPI).
2. K. Borodianskiy, **M. Zinigrad**, 2016-2017, Special issue, Welding, Joining and Casting of Advanced Material, Vol. 9-10, *Materials* (MDPI).
3. K. Borodianskiy, **M. Zinigrad**, 2018-2019, Special issue, Welding, Joining and Coating of Metallic Materials, *Materials* (MDPI).
4. A. Musin, **M. Zinigrad**, 2018-2019, Special issue, Thin Coatings and Patterns by Inkjet Printing Technology, *Coatings* (MDPI).
5. **M. Zinigrad**, 2008, Special issue, Mathematical modeling of physicochemical processes, Vol. 47, *Israel Journal of Chemistry* (Wiley Online Library).

Scientific conferences

1. D. Bograchev, A. Sobolev, **M. Zinigrad**. Corrosion properties of aluminum alloys coated by PEO method in molten salts electrolyte. Israel Corrosion Conference 2022.
2. **M. Zinigrad**. Processing of metal surfaces by the PEO method using a molten salt as an electrolyte. International scientific conference *Modern Chemical Physics - at the Joint of Physics, Chemistry and Biology, Moscow. 2021*
3. N. Astashina, A. Lugovskoy, A. Kossenko, S. Lugovskoy, **M. Zinigrad**, F. Nakonechny, Analysis of efficiency of dental implant osseointegration characterized by various surface types. In *Proceedings of the Tenth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* 5 18-23. Ariel (2018).

4. B. Kazanski, A. Lugovskoy, **M. Zinigrad**, Effect of plasma electrolytic oxidation treatment on corrosion behavior of AZ91D, AM50, AE42 and MRI 230D magnesium alloys. In *Proceedings of the Tenth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **2** 20-35. Ariel (2018).
5. A. Sobolev, A. Kossenko, **M. Zinigrad**, K. Borodianskiy, Creation of oxide coating on Al 1050 alloy. In *Proceedings of the Tenth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 158-164. Ariel (2018).
6. M. Radune, **M. Zinigrad**, S. Kalabukhov, D. Fuks, S. Hayun, N. Frage, Spark plasma sintering of Ti_{1-x}Al_xN nano-powders synthesized by high energy ball milling. In *Proceedings of the Ninth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 168-180. Ariel (2016).
7. M. Radune, **M. Zinigrad**, N. Frumin, S. Hayun, N. Frage, Thermal stability of supersaturated (Ti, Al) N solid solution. In *Proceedings of the Eighth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 102-111. Ariel (2014).
8. Yu. Kuznetsov, A. Kossenko, **M. Zinigrad**. Investigation of coating thickness obtained by plasma electrolytic oxidation on aluminium alloys in electrolytes of type "KOH-H₃BO₃". In *Proceedings of the Eighth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 80-85. Ariel (2014).
9. A. Lugovskoy, **M. Zinigrad**, Plasma Electrolytic Oxidation of Valve Metals. In *Materials Science* 85-102 (ed. I. Mastai) Intec publ. (2013).
10. K. Borodianskiy, **M. Zinigrad**, Computational Methods for Creation Materials with Required Composition and Structure. In *Materials Science* 445-464 (ed. I. Mastai) Intec publ., (2013).
11. Y. Dotsenko, V. Selivorstov, K. Borodianskiy, **M. Zinigrad**, Peculiarities of using hereditary properties of metallic stock with high iron content to obtain high quality Al-Si casting alloy. In *Proceedings of the Seventh International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 256-260. Ariel (2012).
12. V. Selivorstov, Y. Dotsenko, K. Borodianskiy, **M. Zinigrad**, Control of non-equilibrium crystallization of aluminum. In *Proceedings of the Sixth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 155-162. Ariel (2010).
13. Y. Kuznetsov, A. Kossenko, **M. Zinigrad**, Modern two stage coating technology. In *Proceedings of the Fifth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **4** 82-89. Ariel (2008).
14. M. Remennik, A. Kossenko, A. Lugovskoy, **M. Zinigrad**, A. Gedanken, Corrosion resistance of aluminum alloys treated by micro arc oxidation in different electrolytes. In *Proceedings of the Fifth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **4** 59-62. Ariel (2008).
15. A. Fetisov, T. Filinkova, A. Fishman, T. Grigorieva, L. Leontev, V. Lisin, N. Lyakhov, S. Petrova, R. Zakharov, **M. Zinigrad**, The structure of mechanoactivated manganese oxides. In *Proceedings of the Fifth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **2** 159-169. Ariel (2008).
16. K. Borodianskiy, A. Basov, A. Gedanken, **M. Zinigrad**, Mechanical alloying of Cu-Al₂O₃ nanoparticles. In *Proceedings of the Fifth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **2** 141-144. Ariel (2008).
17. M. Radune, F. Assous, **M. Zinigrad**, D. Eliezer, The Development of a mathematical model of sulfur diffusion in the steel and slag phases in its transition from the steel into

- the slag. In *Proceedings of the Fifth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 145-154. Ariel (2008).
18. **M. Zinigrad**, K. Shunyaev, A. Lugovskoy, The calculation of thermodynamic properties and phase diagrams of binary alloys on the basis of chrome. In *Proceedings of the Sohn International Symposium: Advanced processing of metals and materials* 659-665. San Diego, CA. (2006).
 19. T. Arbuzova, N. Chebotaev, B. Gizhevskii, A. Fetisov, E. Kozlov, T. Kyrennykh, L. Leontev, S. Naumov, A. Patselov, V. Pilugin, Yu. Sukhorukov, V. Vykhodets, R. Zakharov, **M. Zinigrad**, Synthesis of compact nanocrystal oxides by severe plastic deformations methods. In *Proceedings of the Sohn International Symposium: Advanced processing of metals and materials* 157-169. San Diego, CA. (2006).
 20. K. Borodianskiy, A. Lugovskoy, V. Mazurovsky, **M. Zinigrad**, A. Gedanken, Modeling of the weld metal microstructure. In *Proceedings of the International Conference on Computer Technology in Welding and Manufacturing* 147-150. Kiev (2006).
 21. S. Lugovskoy, M. Nisnevitch, A. Lugovskoy, **M. Zinigrad**, D. Wolf, Mechanochemical synthesis of salicylic acid formaldehyde co-polymer capable of binding heavy metal ions. In *Proceedings of the Fourth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **4** 158-166. Ariel (2006).
 22. A. Fishman, M. Ivanov, N. Tkachev, K. Shunyaev, **M. Zinigrad**, Competitive interactions and phase states of mixed Jahn–Teller systems. In *Proceedings of the Fourth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **3** 109-120. Ariel (2006).
 23. K. Borodianskiy, V. Mazurovsky, **M. Zinigrad**, A. Gedanken, Creation of shock-abrasion resistance build-up metal using physico-chemical model of high temperature processes. In *Proceedings of the Fourth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **3** 83-92. Ariel (2006).
 24. T.I. Arbuzova, A.N. Ermakov, B.A. Gizhevskii, V.B. Fetisov, T.I. Filenkova, A.Ya. Fishman, G.A. Kozhina, L.I. Leontev, E.G. Miroshnikova, S.V. Naumov, S.A. Petrova, R.G. Zakharov, **M.I. Zinigrad**, Structural, electrochemical and magnetic properties of compact nanocrystal LaMnO_3 -d oxides produced mechanochemically. In *Proceedings of the Fourth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **1** 132-150. Ariel (2006).
 25. A. Kossenko, A. Lugovskoy, **M. Zinigrad**, A mathematical model of powder components oxidation during thermal spray process. In *Proceedings of the Fourth International Conference on Mathematical Modeling and Computer Simulation of Material Technologies* **3** 65-69. Ariel (2006).
 26. K. Borodianskiy, **M. Zinigrad**, V. Mazurovsky, Computer simulation of the carbide formation during primary crystallization processes of a metal. In *Proceedings of the Third International Conference on Welding and Joining 2006: Frontiers of Materials Joining*. Tel-Aviv (2006).
 27. V. Mazurovsky, **M. Zinigrad**, K. Borodianskiy, Welding materials design. In *Proceedings of the First International Electronic Scientific and Technical Conference Computer Technologies in Joining of Materials* 225-231. Tula (2005).
 28. **M. Zinigrad**, V. Mazurovsky, K. Borodianskiy, Physico-chemical and mathematical modeling of phase interaction taking place during fusion welding processes. In *Proceedings of the First International Conference on Diffusion in Solid and Liquids* 841-850. Aveiro (2005).
 29. V. Mazurovsky, **M. Zinigrad**, L. Leontev, V. Lisin, K. Borodianskiy, Quantitative estimation of carbide-forming abilities of *d*-elements. In *Proceedings of the Jubilee Scientific Conference on Physical Chemistry and Technology in Metallurgy* 89-98 Ekaterinburg (2005).

30. **M. Zinigrad**, V. Mazurovsky, K. Borodianskiy, A. Gedanken, Computer simulation of the primary crystallization processes of a metal during welding. In *Proceedings of the Second International Conference on Welding and Joining 2005: Frontiers of Materials Joining*. Tel- Aviv (2005)
31. V. Mazurovsky, **M. Zinigrad**, L. Leontev, V. Lisin, Carbide formation during crystallization upon welding. In *Proceedings of the Third International Conference on Mathematical Modeling and Computer Simulation of Material Technologies 3* 126-134. Ariel (2004).
32. K. Shunyaev, N. Pechischeva, **M. Zinigrad**, Peritectic diagrams of associated solutions. In *Proceedings of the Third International Conference on Mathematical Modeling and Computer Simulation of Material Technologies 3* 113-118. Ariel (2004).
33. V. Mazurovsky, **M. Zinigrad**, V. Mazurovsky, N. Litvak, V. Shumyakov, Implementation of an approach for creating advanced welding materials. In *Proceedings of the Third International Conference on Mathematical Modeling and Computer Simulation of Material Technologies 2* 12-24. Ariel (2004).
34. V. Mazurovsky, **M. Zinigrad**, L. Leontev, V. Lisin, New approach to the design of advanced welding materials. In *Proceedings of the Third International Conference on Mathematical Modeling and Computer Simulation of Material Technologies 2* 1-12. Ariel (2004).
35. B. Zilbergleyt, **M. Zinigrad**, Thermodynamic simulation of complex metallurgical and chemical systems with the method of chemical dynamics. In *Proceedings of the International symposium on Process Control and Optimization in Ferrous and non-Ferrous Metallurgy* 63-76. Chicago, MI (2003).
36. **M. Zinigrad**, V. Mazurovsky, A. Zinigrad, Mathematical modeling of phase interaction taking place during fusion welding processes. In *International symposium, Metallurgical and materials processing: principles and technologies* 667-680. San Diego, CA. (2003).
37. V. Mazurovsky, **M. Zinigrad**, A. Zinigrad, Mathematical model of weld microstructure formation. In *Twelfth International Conference on Computer Technology in Welding, Sidney* 79. TWI (2003).
38. V. Mazurovsky, **M. Zinigrad**, A. Zinigrad, Mathematical representation of a modified Schaeffler diagram. In *Proceedings of the Second International Conference on Mathematical Modeling and Computer Simulation of Metal Technologies 3* 129-139. Ariel (2002).
39. V. Mazurovsky, **M. Zinigrad**, A. Zinigrad, Development of a computer-aided method for designing welding materials. In *Proceedings of the Second International Conference on Mathematical Modeling and Computer Simulation of Metal Technologies 2* 29-37. Ariel (2002).
40. K. Shunyaev, V. Lisin, **M. Zinigrad**, Arbitrary stoichiometry associates and mixture thermodynamics in liquid alloys. In *Proceedings of the Second International Conference on Mathematical Modeling and Computer Simulation of Metal Technologies 1* 12-18. Ariel (2002).
41. M. Shalimov, **M. Zinigrad**, V. Lisin, Thermodynamic characteristics of reactions in metal–slag–gas systems. In *Proceedings of the Second International Conference on Mathematical Modeling and Computer Simulation of Metal Technologies 1* 130-146. Ariel (2002).
42. **M. Zinigrad**, V. Mazurovsky, A. Zinigrad, The development of electrode coating compositions basing on the mathematical modeling of physicochemical processes on metal- slag boundary. In *Proceedings of the Mills Symposium on Metals, Slags, and Glasses: High Temperatures, Properties and Phenomena* 545-553. London (2002).
43. V. Shumiakov, M. Shalimov, **M. Zinigrad**, Coated electrodes with advanced ecological properties. In *Proceedings of the Ural Welding Conference*. Russia (2002).

44. V. Mazurovsky, **M. Zinigrad**, A. Zinigrad, Novel computer-aided method of welding materials design. In *Eleventh International Conference on Computer Technology in Welding Columbus, OH* 273-280. NIST Special Publication 973 (2002).
45. **M. Zinigrad**, V. Mazurovsky, Computer modeling of metallurgical technologies. In *Ninth International Conference on Computer Technology in Welding, Michigan, MA* 164-171. NIST Special Publication 949 (2000).
46. **M. Zinigrad**, V. Mazurovsky, V. Shumyakov, A. Zinigrad, Optimization of the composition of a flux-cored wire for welding galvanized steel based on computer simulation of the welding process. In *Tenth International Conference on Computer Technology in Welding, Copenhagen* 40-47. TWI (2000).
47. **M. Zinigrad**, Development of new welding materials and technologies based on computer simulation. In *Proceedings of the First International Conference Mathematical Modeling and Simulation of Metal Technologies* 140-151. Ariel (2000).
48. V. Mazurovsky, **M. Zinigrad**, A. Zinigrad, Novel method of welding materials design. In *Proceedings of the First International Conference Mathematical Modeling and Simulation of Metal Technologies* 201-206. Ariel (2000).
49. V. Mazurovsky, A. Zinigrad, **M. Zinigrad**, predicting weld structure using modified Schaeffler constitution diagram. In *Proceedings of the First International Conference Mathematical Modeling and Simulation of Metal Technologies* 540-545. Ariel (2000).
50. N. Zalomov, **M. Zinigrad**, V. Boronenkov, Thermodynamics of silicate and aluminate oxide melts used in welding and metallurgical processes. In *Proceedings of Materials Solutions Conference '99 on Joining of Advanced and Specialty Materials II* 236-242, Cincinnati, OH, ASM International (1999).
51. **M. Zinigrad**, V. Mazurovsky, F. Di, Y. Wujun, N. Zalomov, Modeling of the buildup process for production of Ni-Al based high temperature wear resistant coatings. In *Proceedings of International Symposium on Steel for Fabricated Structures* 230-233. Cincinnati, OH (1999).
52. **M. Zinigrad**, N. Zalomov, V. Mazurovsky, O. Aksyutin, Computer approach to the development of welding materials. In *Eighth International Conference on Computer Technology in Welding, Liverpool* 185-192. Elsevier Science & Technology (1998).
53. **M. Zinigrad**, N. Zalomov, V. Mazurovsky, O. Aksyutin, Creating new welding materials on the basis of metallurgical processes modeling. In *Seventh International Conference on Computer Technology in Welding, San Francisco, CA* 291-297. NIST Special Publication 923 (1997).
54. **M. Zinigrad**, M. Shalimov, Application of simulation methods of the analysis of the kinetics of electrochemical processes in melts. In *Proceedings of the Fourth International Colloquium on Process Simulation* 591-597. Espoo (1997).
55. V. Boronenkov, M. Shalimov, **M. Zinigrad**, the mathematical model of chemical processes during the oxyflame melting of copper concentrates. In *Proceedings of the International Symposium*. Saint Petersburg (1997).
56. **M. Zinigrad**, V. Mazurovsky, Modeling of metallurgical welding processes for the purpose of creating new welding materials. In *Proceedings of the Modeling and Simulation in Metallurgical Engineering and Materials Science International Conference (MSMM'96)* 669-673. Beijing (1996).
57. **M. Zinigrad**, V. Mazurovsky, O. Gafri, Development of the new welding materials made of waste products. In *Proceedings of the Welding Conference* 63-67. Israel (1994).
58. **M. Zinigrad**, A. Okol'zdaev. Limiting stage of tungsten anodic oxidation on the boundary of molten metal and slag. In *Fourth International Conference on Molten Slags and Fluxes* 62, Sendai, Japan, 1992.

59. **M. Zinigrad**. Simulation of metal and slag melts interaction for optimization and development of technological processes. In *Fourth International Conference on Molten Slags and Fluxes* 125, Sendai, Japan, 1992
60. **M. Zinigrad**, A. Phljagin, E. Melnikova, Model and program of metal composition calculation in hard surfacing. In *Proceedings of the Scientific Seminar* 46-49. Leningrad (1990).
61. **M. Zinigrad**, A. Okolzdajev, A. Phljagin, Influence of slag properties on tungsten transition velocity through the boundary of Fe-C and slag melts. In *Proceedings of the Seventh Conference on Physical Chemistry of Melts* 208-211. Cheljabinsk (1990).
62. A. Phljagin, **M. Zinigrad**, Calculation of metal composition after hard surfacing under flux. In *Proceedings of the Welding Conference* 130-137. Perm (1989).
63. S. Panov, M. Shalimov, **M. Zinigrad**, Velocity of metal desulfurization in hard surfacing and submerged arc welding. *Proceedings of the Welding Conference* 138-142. Perm (1989).
64. **M. Zinigrad**, A. Phljagin, A. Okolzdajev, Thermodynamics and kinetics of tungsten transition through the boundary of Fe-C and slag melts. In *Proceedings of the First International Symposium on Theory of Metallurgical Processes* 111-115. Moscow (1989).
65. **M. Zinigrad**, A. Timoshin, Computer equipment for investigation of kinetics of electrochemical processes. In *Proceedings of the All-Russian conference: Structure and properties of metallic and slag melts* 310-311. Uralskiy Nauchniy Tsentr), AN SSSR, Sverdlovsk (1986).
66. **M. Zinigrad**, Physical-chemical and mathematical modeling of metal and oxide melts interaction. In *Proceedings of the All-Russian conference: Structure and properties of metallic and slag melts* 25-27. (ed. Uralskiy Nauchniy Tsentr), AN SSSR, Sverdlovsk (1986).
67. **M. Zinigrad**, S. Panov, Desulphurization of Fe-C melts by oxides. In *Proceedings of the All-Russian conference: Structure and properties of metallic and slag melts* 142. (ed. Uralskiy Nauchniy Tsentr), AN SSSR, Sverdlovsk (1983).
68. S. Panov, **M. Zinigrad**, L. Barmin, Investigation of the fast step of the desulphurization of iron-carbon melt by slag. In *Proceedings of the All-Russian conference: Structure and properties of metallic and slag melts* 60-63. (ed. Uralskiy Nauchniy Tsentr), AN SSSR, Sverdlovsk (1980).
69. **M. Zinigrad**, A. Phephelov, L. Barmin, Interaction of Fe-B melts and slag melts. In *Proceedings of the All-Russian conference: Structure and properties of metallic and slag melts* 89. Uralskiy Nauchniy Tsentr), AN SSSR, Sverdlovsk (1980).
70. V. Boronenkov, S. Shanchurov, **M. Zinigrad**, Kinetic analysis of the processes occurring in the combined oxidation of metal impurities. In *Proceedings of the Third All-Union Scientific Conference on Current Problems in the Electrometallurgy of Steel* 206 83-89 (1978).
71. **M. Zinigrad**, S. Panov, L. Barmin, Viscosity coefficient depends on concentration. In *Proceedings of the All-Russian conference: Structure and properties of metallic and slag melts* 70. (ed. Uralskiy Nauchniy Tsentr), AN SSSR, Sverdlovsk (1976).
72. **M. Zinigrad**, A. Phljagin, Kinetics of redox reactions of metal and flux involving aluminum. In *Proceedings of the Ural Welding Conference* 15. Sverdlovsk (1976).
73. **M. Zinigrad**, L. Barmin, S. Popel, M. Lvov, Application of the corrosion diagram method for investigation of reaction kinetics on boundary of metal and slag melts. In *Proceedings of the International Symposium: New methods of investigation of metal reduction processes* 149-162. Moscow (1972).

Refereed articles and refereed letters in scientific journals, running numbers

1. Manasa Kumar Rath, A. Kossenko, V. Danchuk, M. Shatalov, Or Rahumi, K. Borodianskiy, **M. Zinigrad**, Trilochan Sahoo, Satrujit Mishra. Development of highly efficient and durable large-area solid oxide fuel cell by a direct-ink-writing three-dimensional printer. 2022. SSRN preprint <http://dx.doi.org/10.2139/ssrn.4180289>;
2. Ramarajan Ramanathan, **M. Zinigrad**, Dhivyaprasath Kasinathan and Ranjith Kumar Poobalan. Zinc stannate (Zn₂SnO₄)-based hybrid composite photoanode for dye-sensitized solar cell application. ACS Appl. Energy Mater. 2022, <https://doi.org/10.1021/acsaem.2c01981>;
3. A.Sobolev, D. Bograchev, **M. Zinigrad**, K. Borodianskiy. Evolution of corrosion on microstructure of ceramic coating produced by plasma electrolytic oxidation in molten salt. Ceramics International, V. 48, Issue. 8, 15, 2022, 10990-10998;
4. A.Sobolev, D. Bograchev, K. Borodianskiy, **M. Zinigrad**. Kinetics and mechanism of corrosion of oxide coating fabricated on aluminum alloy by the plasma electrolytic oxidation in molten salt. Corrosion Science, V. 208, 2022, 110604;
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Patents

17-Nov-2021

1. PCT/IL2021/051365. A. Kossenko, A. Sobolev, A. Krasnopol'ski, **M. Zinigrad**. Solid oxide fuel cell arrangement generating ammonia as byproduct and utilizing ammonia as secondary fuel, 2021.
2. WO2020141500. V. Goldshtein, A. Kossenko, A. Sobolev, **M. Zinigrad**. Solid oxide fuel cell arrangement generating ammonia as byproduct and utilizing ammonia as secondary fuel, 2019.
3. WO2020170236. Manasa Kumar, Rath, A. Kossenko, A. Krasnopol'ski, **M. Zinigrad**. Solid oxide fuel cell with scandium-modified nickel felt anode collector, 2019.
4. K. Borodianskiy, A. Krasnopol'ski, **M. Zinigrad**, Copper-based substances with nanomaterials. US provisional patent application No. 62/695055 2018.
5. K. Borodianskiy, **M. Zinigrad**, A. Sobolev, A. Kossenko, A. Krasnopol'ski. Advanced methods of Plasma Electrolytic Oxidation (PEO) treatment using solid or foam-based electrolytes. US provisional patent application No. 62/629719 2018.
6. A. Krasnopol'ski, **M. Zinigrad**, Method and system for cooling by using solar energy. Patent WO 2008135990 A2, 2008.
7. A. Timoshin, P. Ivanov, **M. Zinigrad**, M. Shalimov, V. Tokar, Flux for electroslag remelting. Patent USSR 1767884, 1991.

8. V. Ilinsky, A. Okolzdajev, **M. Zinigrad**, A. Fljagin, A. Fefelov, N. Korolev, V. Merkulov, V. Miroshnichenko, Ceramic flux for hardsurfacing. Patent USSR 1485543, 1989.
9. V. Ilinsky, **M. Zinigrad**, A. Fljagin, A. Balin, M. Shalimov, L. Barmin, B. Zilbergleit, Ceramic flux for hardsurfacing Patent USSR 1352820, 1987.
10. Balin, L. Barmin, **M. Zinigrad**, B. Zilbergleit, A. A. Kojevnikov, Yu. Plishevskiy, Flux for hardsurfacing. Patent USSR 1073975, 1983.
11. A. Balin, L. Barmin, **M. Zinigrad**, B. Zilbergleit, E. Shulimovich, I. Naydenov, Flux for hardsurfacing. Patent USSR 1075544, 1983.

Research Grants

2019-2021	Israeli Ministry of Science and Technology, K. Borodianskiy, A. Musin, M. Zinigrad , "Exact sciences-3D printing. Development of innovative 3D Ink-jet printing technology for efficient and durable solid oxide fuel cell", 595,000 NIS.
2016-2022	Norma Investments Ltd., British Virgin Islands, M. Zinigrad , "Solid oxide fuel cells (SOFC) –using scandium", 1,650,000 USD.
2016-2022	Norma Investments Ltd., British Virgin Islands, M. Zinigrad , "Photovoltaic cells doped with scandium", 1,700,000 USD.
2016-2017	M. Zinigrad , "Zimin Foundation", 500,000 USD.
2015-2017	Israeli Ministry of Economy and Industry, Framework Kamin, M. Zinigrad , N. Astashina, "Development of a technology for the Mechanical properties improvement of copper-based alloys by nano-sized materials", 794,000 NIS.
2012-2015	Framework of the Resolution of the Perm Krai Government, Russia: Granting of subsidies for realization of scientific projects by international research groups of scientists on the base of state educational institutions of higher professional education, M. Zinigrad , N. Astashina, "Development of a technology for producing dental implants with surface coatings improved for osseo-integration", 93,246 USD.
2009	Israeli Ministry of Industry, Framework MAGNETON, M. Zinigrad , "Technology development for mechanical properties improvement of castaluminum alloys by nano and ultrafine materials", 773,820 NIS.
2007	Israeli Ministry of Industry Framework NOFAR, M. Zinigrad , "Developing of the Metal Materials with required structure and properties using nano sized powders", 418,280 NIS.
2006	Israeli Ministry of Industry Framework MAGNETON, M. Zinigrad , "Environmentally Friendly Coating Technology As An Alternative To The Electrolytic Hard Chrome Plating", 1,053,219 NIS.

2006	Israeli Ministry of Science, M. Zinigrad , "Obtaining Compact Nanomaterials Based on Transition Metal Oxides by Intensive Plastic Deformations, Investigating their Structure and Properties", 129,360 NIS.
2004	Israeli Ministry of Science, M. Zinigrad , L. Leontiev "Synthesis of compact nanocrystal lanthanum manganites by the hard plastic deformations method. Investigations of the structure and stability of the nanostates in different oxidizing media, analysis of electric, magnetic and diffusion properties", 40,000 NIS.
2002	GM Foundation, M. Zinigrad , "Air pressure Welding of Dissimilar Metals", 12,000 USD.
1999-2001	GM Foundation, M. Zinigrad , "Modeling and simulation in Materials Engineering", 35,000 USD.
1998-2001	Israeli Ministry of Industry and Trade, M. Zinigrad , "New compositions of Flux core electrodes", 400,000 USD.
1998-2000	GM Foundation, M. Zinigrad , "Development of a new welding material", 45,000 USD.
1997-2000	China-Israel Foundation for Scientific and Strategic R&D, Israeli Ministry of Science, M. Zinigrad , F. Di, "Development of high-temperature wear –resistant metallic material based on Ni- Al intermetallics", 100,000 USD.

Synopsis of research, including reference to publications and grants in above lists

(Do not exceed three single-spaced pages.)

Present Academic Activities

- Over 40 years of experience in Materials Science and Materials Engineering, Mathematical modeling and simulation.
- Founded the Research Laboratory for Advanced Materials Investigations.
- Theoretical and experimental investigations on high-temperature processes.
- Development of new materials based on mathematical modeling of physicochemical and technological processes.
- Plasma electrolytic oxidation (PEO) coatings on aluminum and magnesium alloys created in aqueous solution and molten salt electrolytes.
- Solid oxide fuel cell investigation.
- Metal alloys strengthening by nanoparticles.
- Ink-jet printed thin layers.