

Assoc. Prof. ÖZGE BALCI-ÇAĞIRAN



PERSONAL DETAILS

Date and Place of Birth: 1985, İstanbul

Address: İzmir Institute of Technology, Department of Materials Science and Engineering, Gülbahçe Kampüsü 35430 Urla / İzmir

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RESEARCH AREAS

Boron based advanced materials and applications, synthesis of inorganic materials, functional nanoparticles, composite materials, boron based nanocatalysts, nanomaterials, powder metallurgy, process technology, materials characterization

EDUCATION

Ph.D., Metallurgical and Materials Engineering, Istanbul Technical University, 2015.

Research, Institute of Complex Materials, IFW Dresden, Leibniz Institute for Solid State and Materials Research, Germany, 2012-2013.

M.Sc., Production Metallurgy and Technologies Engineering, Istanbul Technical University, 2010.

B.Sc., Metallurgical and Materials Engineering, Istanbul Technical University, 2008.

Diploma, Physics-Mathematic, Üsküdar Ahmet Keleşoğlu Anatolian High School, 2003.

PROFESSIONAL & RESEARCH EXPERIENCES

Assistant Professor	İzmir Institute of Technology, Department of Materials Science and Engineering, <i>March 2024 – current.</i>
Associate Professor	Council of Higher Education (YÖK), Turkey, <i>28.07.2021.</i>
Research Assistant Professor & Faculty Member	Koç University, College of Sciences, Department of Chemistry, Istanbul, Turkey, <i>September 2019 – 2023.</i>
Executive Council Member	Koç University Boron and Advanced Materials Application and Research Center (KUBAM), Turkey, <i>October 2019 – 2022.</i>
Coordinator	Koç University Akkim Boron-Based Materials and High Technology Chemicals Research and Application Center (KABAM), Turkey, <i>July 2017 – September 2019.</i>
Postdoctoral Researcher	Koç University, Department of Chemistry, <i>February 2016 – September 2019.</i> <u>Research:</u> Synthesis and applications of inorganic materials and boron based functional nanoparticles.
Visiting Postdoctoral Researcher	Max Planck Institute for Chemical Physics of Solids (MPI-CPfS), Dresden, Germany, <i>August-September 2017 / August-September 2018 / August-September 2019 / February-March 2020.</i> <u>Research:</u> Synthesis and EBSD analysis of metal boride materials and intermetallic compounds.
Instructor & Part-time Faculty Member	İstanbul Bilgi University, Faculty of Engineering and Natural Sciences, <i>2016-2017, 2019, 2020.</i>

Researcher	IFW Dresden, Leibniz Institute for Solid State and Materials Research, Institute of Complex Materials, Dresden, Germany, 2012 – 2013. <u>Research:</u> Production and mechanical analyses of Al metal matrix composites reinforced with Fe-based glassy particles.
Ph.D. in Metallurgical and Materials Engineering	İstanbul Technical University, 2010 – 2015. <u>Thesis Title:</u> Fabrication of vanadium and niobium borides via milling-assisted solid state synthesis methods and sintering techniques.
M.Sc. in Production Metallurgy and Technologies Engineering	İstanbul Technical University, 2008 – 2010. <u>Thesis Title:</u> The gas-phase production of elemental boron by thermal dissociation method.

TEACHING ACTIVITIES

Undergraduate Lectures

- 1) 2021 (Summer), SCIE 105 *Materials and Society* (English), College of Sciences, Koç University. (Students: 17, Lecture (h): 3)
- 2) 2021 (Spring), MECA 205 *Material Science for Engineers* (English), Faculty of Engineering and Natural Sciences, İstanbul Bilgi University. (Students: 83, Lecture + Class (h): 3+1)
- 3) 2020 (Spring), MECH 390 *Independent Study*, College of Sciences, Koç University, “Production of Ti-based complex shaped ceramics and literature review on potential biomedical applications of the samples with improved mechanical properties”.
- 4) 2019 (Spring), MECA 205 *Material Science for Engineers* (English), Faculty of Engineering and Natural Sciences, İstanbul Bilgi University. (Students: 71, Lecture + Class (h): 3+1)
- 5) 2017 (Spring), ENGR 205 *Material Science for Engineers* (English), Faculty of Engineering and Natural Sciences, İstanbul Bilgi University. (Students: 36, Lecture (h): 3)
- 6) 2016 (Fall), ENGR 205 *Material Science for Engineers* (English), Faculty of Engineering and Natural Sciences, İstanbul Bilgi University. (Students: 95, Lecture (h): 3)

Supervised Theses (graduated)

- 1) Özlem Evren, Aluminum nitride and boron nitride based multifunctional micro/nano particles for thermal interface materials, *M.Sc. Thesis*, Koç University, Graduate School of Sciences and Engineering, Materials Science and Engineering Graduate Program, August 2023.
- 2) Aybike Paksoy, Iron, Cobalt and Nickel-Based Metal Borides as Low-Cost Nanocatalysts for Highly Efficient Hydrolysis of Sodium Borohydride, *M.Sc. Thesis*, Koç University, Graduate School of Sciences and Engineering, Materials Science and Engineering Graduate Program, January 2022.

Co-supervised Theses (graduated)

- 1) Sina Khoshshima, Synthesis and optimization of the transition metal boride nanoparticles and their possible magnetic/hybrid composite applications, *Ph.D. Thesis*, Koç University, Graduate School of Sciences and Engineering, November, 2020.

RESEARCH PROJECTS

Scientific / Industrial projects (Principal Investigator / Consultant)

- 1) “Development of boron- and carbide-based functional micro/nano composites based on elemental boron with efficient techniques”, TUBITAK 1505 TEYDEB Project No: 5210099, 2022-2023, **Principal Investigator**.
- 2) “National Development of Aluminum Nitride and Aluminum Nitride-Based Multifunctional Micro / Nanoparticles with Efficient Techniques for High Performance Thermal Management Materials and Their Use in Thermally Conductive Polymer Adhesives”, TUBITAK 1005 Project No: 121M611, 2021-2023, **Principal Investigator**.
- 3) “Development of functional coating materials to minimize the wear potential of refractory materials” ŞİŞECAM Project, 2021-2022, **Principal Investigator**.
- 4) “Pilot scale production of metal borides with a special furnace design that prevents boron oxide loss at high temperatures” TÜBİTAK TEYDEB 1501 Project by PAVTEC Company, No: 3210225, 2021-2022, **Consultant**.
- 5) “Production of high-purity boron trichloride gas and micro/nano structured boron nitride in a continuous system” TÜBİTAK TEYDEB 1507 Project by PAVTEC Company, No: 7201084, 2021-2022, **Consultant**.
- 6) “Synthesis and Sintering Processes of Metal Borides”, ROKETSAN Project, 2019-2020, **Principal Investigator**.

- 7) “Novel Low Temperature Synthesis of Cobalt – Metal – Boron (Metal=Ni, Fe, Ti) Based Ternary Metal Borides from Metal Chlorides: Characterization and Application Oriented Investigations on Catalyzer/Magnet/Hybrid Composite Fabrication”, TUBITAK 3501 Project No: 117F178, 2017-2019, **Principal Investigator**.
- 8) “Industrial production of boron carbide by alternative methods” TÜBİTAK TEYDEB 1501 Project by Ak-Kim Company, No: 3170709, 2017 – 2018, **Consultant**.

Scientific projects (Researcher / Professional Fellow)

- 1) “Encapsulation of Iron Based Magnetic Nanoparticles by Multi-Layer Graphene Shells Using Different Techniques, Characterization of Core/Shell Type Nanocapsules and Their Performance Tests for Biomedical Applications”, TUBITAK 1001 Project No: 118F430, 2019-2022, **Researcher**.
- 2) “Preparation of high-efficiency N- and P-Type Thermoelectric Materials and Modules”, TUBITAK 1001 Project No: 218M335, 2019-2022, **Researcher**.
- 3) “The Industrial-Scale Fabrication of High-Purity Amorphous Boron Powders”, BOREN Project No: 2013.Ç0385, 2013-2015, **Researcher**.
- 4) “The Fabrication of Niobium Boride/Carbide Composite Powders by Mechanical Activation and Carbothermal Reduction Methods”, İ.T.Ü. Scientific Research Projects No: 37812, 2013-2015, **Researcher**.
- 5) “Synthesis of Refractory Metal Borides via Three Different Production Methods from Solid, Liquid and Gas Raw Materials for Various Application Areas, Sintering, Characterization, Comparison of Process and Final Products”, TÜBİTAK 1003 Project No: 112M470, 2012-2015, **Professional Fellow**.
- 6) “Characterization Investigations on the Gas-Phase Fabrication of Elemental Boron”, İ.T.Ü. Scientific Research Projects No: 33648, 2010-2012, **Researcher**.
- 7) “Synthesis of Lanthanum, Cerium and Samarium Borides by Solid-State Reaction at Room Temperature” TÜBİTAK 1005 Project No: 109M364, 2010-2011, **Professional Fellow**.
- 8) “Development of Tungsten based Hybrid Composites via Activated Sintering and Mechanical Alloying using High Energy Milling at Cryogenic and Ambient Conditions and Related Characterization Investigations” TÜBİTAK 1001 Project No: 110M130, 2010-2012, **Professional Fellow**.
- 9) “The Gas Phase Production of Pure Elemental Boron Powder by an Alternative Method”, BOREN Project No: 2009-Ç0241, 2009-2011, **Researcher**.

REWARDS, CERTIFICATES, ACHIEVEMENTS

Best Communication Award, 21st International Symposium on Boron, Borides and related materials, Paris, France, 2022.

Scientific Research Scholarship, German Academic Exchange Service, DAAD, 2012.

Best Poster Awards,

3th International Ceramic Glass Porcelain Enamel Glaze and Pigment Congress, Eskişehir, Turkey, 2014.

12th International Symposium on Novel and Nano Materials, İstanbul, Turkey, 2012.

12th International Workshop on Nanoscience and Nanotechnology, Varna, Bulgaria, 2010.

Young Scientist Award, 14th International Metallurgy and Materials Congress, İstanbul, Turkey, 2008.

Certificate of Outstanding Contribution in Reviewing, *Journal of Alloys and Compounds / Advanced Powder Technology*, Elsevier Reviewer Recognition, 2016.

Training Certifications for TGA-DSC, FT-IR, XRD, GC-MS, UV-VIS, Heat Microscope, 2013-2014.

Experience in FactSage™ Thermodynamical Software, 2012-current.

Responsible Leadership Basic Education in Metallurgy, Material and Chemistry Sectors, Education Certificate, UCTEA Chamber of Metallurgical Engineers, UCTEA Chamber of Chemical Engineers, İstanbul, Turkey, 2008.

Deutsches Sprachdiplom, Staendige Konferenz der Kultusminister der Laender in der Bundesrepublik Deutschland, 2003.

PUBLICATIONS

International Journal Articles (SCI, SCIE)

- 1) Paksoy A. Yıldırım İ.D., Arabi S., Güngör A., Erdem E., **Balcı-Çağırın Ö.*** (2024). Enhanced performance and cycling behavior in symmetric supercapacitors developed by pure HfB₂ and HfB₂-SiC composites, *Journal of Alloys and Compounds*, 983, 173749.

- 2) Mertdinç-Ülküseven S., Onbasli K., Çakır E., Morova Y., **Balci-Çağiran Ö.**, Acar H.Y., Sennaroğlu A., Öveçoğlu M.L., Ağaoğulları D. (2023). Magnetic core/shell structures: A case study on the synthesis and phototoxicity/cytotoxicity tests of multilayer graphene encapsulated Fe/ Fe₃C nanoparticles, *Journal of Alloys and Compounds*, 968, 172145.
- 3) Paksoy A. Buldu-Akturk M., Arabi S., Erdem E., **Balci-Çağiran Ö.*** (2023). Synthesis and capacitive performance of ZrB₂ and its composites as supercapacitor electrodes, *Solid State Sciences*, 142, 107256.
- 4) Boztemur B., Bayrak K. G., Gökçe H., Ayas E., **Balci-Çağiran Ö.**, Derin B., Ağaoğulları D., Öveçoğlu M.L. (2023). Mechanically alloyed and spark plasma sintered WNbMoVTa refractory high entropy alloys: Effects of Cr and Al on the microstructural and mechanical properties, *Journal of Alloys and Compounds*, 965, 171415.
- 5) Mertdinç-Ülküseven S., Khakzad F., Aslan C., Onbasli K., Çevik Ç., İşçi S., **Balci-Çağiran Ö.**, Acar H.Y., Öveçoğlu M.L., Ağaoğulları D. (2023). Fe₂B magnetic nanoparticles: Synthesis, optimization and cytotoxicity for potential biomedical applications, *Journal of Science: Advanced Materials and Devices*, 8 (3), 100602.
- 6) Arıbuğa D., Karaahmet O., **Balci-Çağiran Ö.**, Çiçek B. (2023). Effect of Al₂O₃ and ZrO₂ filler material on the microstructural, thermal and dielectric properties of borosilicate glass-ceramics, *Micromachines*, 14(3), 595.
- 7) Kavak S., Bayrak K. G., Mansoor M., Kaba M., Ayas E. **Balci-Çağiran Ö.**, Derin B., Öveçoğlu M.L., Ağaoğulları D. (2023). First principles calculations and synthesis of multi-phase (HfTiWZr)B₂ high entropy diboride ceramics: Microstructural, mechanical and thermal characterization, *Journal of the European Ceramic Society*, 43, 768-782.
- 8) Shahzad A., Khan S.A., Paksoy A., **Balci-Çağiran Ö.**, Lazoglu İ. (2022). Negative additive manufacturing of Al₂O₃-Al cermet material by fused deposition and Direct Ink Writing, *Materials Today Communications*, 33, 104739.
- 9) Paksoy A., Kurtoğlu-Öztulum S.F., Yağcı M.B., **Balci-Çağiran Ö.*** (2022). Low-cost and reusable iron-and nickel-based metal boride nanoparticles for efficient catalytic hydrolysis of sodium borohydride, *International Journal of Hydrogen Energy*, 47, 36898-36913.
- 10) Mertdinç-Ülküseven S., Savacı U., Onbaşlı K., **Balci-Çağiran Ö.**, Yağcı Acar H., Öveçoğlu M.L., Ağaoğulları D., (2022). In-situ synthesis of graphene encapsulated Fe/Fe₂O₃ nanoparticles for possible biomedical applications, *Journal of Materials Research and Technology*, 20, 2558-2577.
- 11) Khoshshima S., Mertdinç S., Motallebzadeh A., Altıntaş Z., Ağaoğulları D., **Balci-Çağiran Ö.*** (2022). Enhanced hardness and wear resistance of Al-based hybrid MMCs by using of composite metal boride reinforcement particles, *Materials Chemistry and Physics*, 288, 126377.
- 12) Buldu-Aktürk M., **Balci-Çağiran Ö.***, Erdem E. (2022), EPR investigation of point defects in HfB₂ and their roles in supercapacitor device performances, *Applied Physics Letters*, 120, 153901 (selected as the **FEATURED ARTICLE** of the issue).
- 13) Arıbuğa D., Akkaşoğlu U., Çiçek B., **Balci-Çağiran Ö.*** (2022). Enhanced Sinterability, Thermal Conductivity and Dielectric Constant of Glass-Ceramics with PVA and BN Additions, *Materials*, 15, 1685.
- 14) **Balci Ö.***, Buldu M., Ammar A.U., Kiraz K., Somer M., Erdem E. (2021), Defect-induced B₄C electrodes for high energy density supercapacitor devices, *Nature Scientific Reports*, 11, 11627.
- 15) Paksoy A., Kurtoğlu S.F., Dizaji A.K., Altıntaş Z., Khoshshima S., Uzun A., **Balci Ö.***. (2021). Nanocrystalline cobalt-nickel-boron (metal boride) catalysts for efficient hydrogen production from the hydrolysis of sodium borohydride, *International Journal of Hydrogen Energy*, 46, 7974-7988.
- 16) Altıntaş Z., Khoshshima S., Schmidt M., Bobnar M., Burkhardt U., Somer M., **Balci Ö.***. (2021). Evolution of magnetic properties of crystalline cobalt-iron boride nanoparticles via optimization of synthesis conditions using hydrous metal chlorides, *Journal of Magnetism and Magnetic Materials*, 523, 167634.
- 17) Khoshshima S., Altıntaş Z., Burkhardt U., Schmidt M., Prashanth K.G., Somer M., **Balci Ö.***. (2020). CoB-TiB₂ crystalline powders: Synthesis, microstructural analysis and their utilization as reinforcement agent, *Advanced Powder Technology*, 31, 2964-2972.
- 18) Maity T., **Balci Ö.**, Gammer C., Ivanov E., Eckert J., Prashanth K.G. (2020). High pressure torsion induced lowering of Young's modulus in high strength TNZT alloy for bio-implant applications, *Journal of the Mechanical Behavior of Biomedical Materials*, 108, 103839.
- 19) Ovalı D., **Balci Ö.**, Ağaoğulları D., Öveçoğlu M.L., (2020). Effects of oxide particles on the microstructural and mechanical properties of W-Ni-WB composites, *Particulate Science and Technology*, 38 (3), 347-353.
- 20) Khoshshima S., Altıntaş Z., Schmidt M., Bobnar M., Somer M., **Balci Ö.***. (2019). Crystalline CoFeB nanoparticles: Synthesis, microstructure and magnetic properties, *Journal of Alloys and Compounds*, 805, 471-482.

- 21) **Balci Ö.***, Ağaoğulları, D., Suryanarayana C., Duman İ., Öveçoğlu, M. L. (2019). Synthesis and characterization of vanadium boride powders and their sintered bodies, *Materials Research Express*, 6, 096542.
- 22) **Balci Ö.***, Prashanth K.G., Scudino S., Somer M., Eckert J. (2019). Powder metallurgy of Al-based composites reinforced with Fe-based glassy particles: Effect of microstructural modification, *Particulate Science and Technology*, 37(3), 286-291.
- 23) Ağaoğulları D., **Balci Ö.**, Akçamlı N., Duman İ., Öveçoğlu M.L. (2019). Effects of different milling conditions on the properties of lanthanum hexaboride nanoparticles and their sintered bodies, *Ceramics International*, 45, 18236-18246.
- 24) Ağaoğulları D., **Balci Ö.**, Akçamlı N., Suryanarayana C., Duman İ., Öveçoğlu M.L. (2019). Mechanochemical synthesis and consolidation of nanostructured cerium hexaboride, *Processing and Application of Ceramics*, 13 (1), 32-43.
- 25) **Balci Ö.***, Burkhardt U., Schmidt M., Hennicke J., Yağcı M.B., Somer M. (2018). Densification, microstructure and properties of TiB₂ ceramics fabricated by spark plasma sintering, *Materials Characterization*, 145, 435-443.
- 26) **Balci Ö.***, Ağaoğulları, D., Gökçe H., Öveçoğlu, M. L, Somer M. (2018). Effect of cryomilling on matrix/reinforcement interfaces and properties of Al-TiB₂ composites, *Journal of Alloys and Compounds*, 757, 393-402.
- 27) Maity T., Prashanth K.G., **Balci Ö.**, Wang Z., Jia Y.D., Eckert J. (2018). Plastic deformation mechanisms in severely strained eutectic high entropy composites explained via strain rate sensitivity and activation volume, *Composites Part B*, 150, 7-13.
- 28) Maity T., Prashanth K.G., **Balci Ö.**, Kim J.T., Schöberl T., Wang Z., Eckert J. (2018). Influence of severe straining and strain rate on the evolution of dislocation structures during micro-/nanoindentation in high entropy lamellar eutectics, *International Journal of Plasticity*, 109, 121-136.
- 29) Ağaoğulları D., **Balci Ö.**, Öveçoğlu M.L., Duman İ., (2018). Effects of milling parameters on the microstructural and thermal properties of nanocrystalline lanthanum hexaboride powders, *Journal of Australian Ceramic Society*, 54(1), 2018, 177-190.
- 30) Akçamlı N., Ağaoğulları D., **Balci Ö.**, Öveçoğlu M.L., Duman İ., (2018). Room-temperature mechanochemical synthesis and consolidation of nanocrystalline HfB₂-HfO₂ composite powders, *Journal of Ceramic Science and Technology*, 9(2), 101-118.
- 31) İpekçi M., Acar S., Elmadağlı M., Hennicke J., **Balci Ö.***, Somer M. (2017). Production of TiB₂ by SHS and HCl leaching at different temperatures: Characterization and investigation of sintering behavior by SPS, *Ceramics International*, 43, 2039-2045.
- 32) Ağaoğulları D., **Balci Ö.**, Öveçoğlu M.L. (2017). Effect of milling type on the microstructural and mechanical properties of W-Ni-ZrC-Y₂O₃ composites, *Ceramics International*, 43, 7106-7114.
- 33) Akçamlı N., Ağaoğulları D., **Balci Ö.**, Öveçoğlu M.L., Duman İ., (2017). Synthesis of bulk nanocrystalline HfB₂ from HfCl₄-NaBH₄-Mg ternary system, *Journal of Materials Science*, 52(21), 12689-12705.
- 34) Ağaoğulları D., **Balci Ö.**, Öveçoğlu M.L., Duman İ., (2017). Microstructural evaluation of ZrB₂/ZrO₂ ceramic powders prepared by milling-assisted magnesiothermic reduction of oxide raw materials, *KONA Powder and Particle Journal*, 34, 183-196.
- 35) **Balci Ö.***, Ağaoğulları D., Muhaffel F., Öveçoğlu M. L, Çimenoglu H., Duman İ. (2016). Effect of sintering techniques on the microstructure and mechanical properties of niobium borides, *Journal of the European Ceramic Society*, 36(13) 3113-3123.
- 36) Akçamlı N., Ağaoğulları D., **Balci Ö.**, Öveçoğlu M. L, Duman İ. (2016). Mechanical activation-assisted autoclave processing and sintering of HfB₂-HfO₂ ceramic powders, *Ceramics International*, 42(13), 14642-14655.
- 37) Akçamlı N., Ağaoğulları D., **Balci Ö.**, Öveçoğlu M. L and Duman İ. (2016). Synthesis of triclinic and hexagonal SmBO₃ powders by mechanically activated annealing of Sm₂O₃ and B₂O₃ blends, *Ceramics International*, 42(8), 10045-10057.
- 38) **Balci Ö.***, Ağaoğulları D., Öveçoğlu M. L, Duman İ. (2016). Synthesis of niobium borides by powder metallurgy methods using Nb₂O₅, B₂O₃ and Mg blends, *Transactions of Nonferrous Metals Society of China*, 26, 747-758.
- 39) Akçamlı N., Ağaoğulları D., **Balci Ö.**, Öveçoğlu M. L, Duman İ. (2016). Synthesis of HfB₂ powders by mechanically activated borothermal reduction of HfCl₄, *Ceramics International*, 42(3), 3797-3807.
- 40) Ağaoğulları D., **Balci Ö.**, Öveçoğlu M. L., Duman İ. (2016). Preparation of LaB₆ Powders via Calciothermic Reduction using Mechanochemistry and Acid Leaching, *KONA Powder and Particle Journal*, 33, 203-218.
- 41) Ağaoğulları D., **Balci Ö.**, Öveçoğlu M. L., Suryanarayana C., Duman İ. (2015). Synthesis of Bulk Nanocrystalline Samarium Hexaboride, *Journal of the European Ceramic Society*, 35 (15), 4121-4136.

- 42) **Balci Ö.***, Ağaoğulları D., Ovalı D., Öveçoğlu M. L., Duman İ. (2015). In Situ Synthesis of NbB₂-NbC Composite Powders by Milling-Assisted Carbothermal Reduction of Oxide Raw Materials, *Advanced Powder Technology*, 26, 1200-1209.
- 43) **Balci Ö.**, Prashanth K. G., Scudino S., Ağaoğulları D., Duman İ., Öveçoğlu M. L., Uhlenwinkel V. and Eckert J. (2015). Effect of Milling Time and the Consolidation Process on the Properties of Al Matrix Composites Reinforced with Fe-Based Glassy Particles, *Metals*, 5, 669-685.
- 44) **Balci Ö.***, Ağaoğulları D., Gökçe H., Duman İ., Öveçoğlu M. L. (2014). Influence of TiB₂ Particle Size on the Microstructure And Properties of Al Matrix Composites Prepared via Mechanical Alloying And Pressureless Sintering, *Journal of Alloys and Compounds*, 586, 578-584.
- 45) Ağaoğulları D., **Balci Ö.**, Gökçe H., Öveçoğlu M. L., Duman İ. (2013). Comparative Investigations of the Activated Sintered W-1 wt.% Ni Composites Reinforced with Various Boride and Oxide Particles, *International Journal of Refractory Metals and Hard Materials*, 41, 577-584.
- 46) Ağaoğulları D., **Balci Ö.**, Gökçe H., Duman İ., Öveçoğlu M. L. (2012). Synthesis of Magnesium Borates by Mechanically Activated Annealing, *Metallurgical and Materials Transactions A-Physical Metallurgy and Materials Science*, 43A (7), 2520-2533.
- 47) **Balci Ö.***, Ağaoğulları D., Duman İ., Öveçoğlu M. L. (2012). Carbothermal Production of ZrB₂-ZrO₂ Ceramic Powders from ZrO₂-B₂O₃/B System by High-Energy Ball Milling and Annealing Assisted Process, *Ceramics International*, 38 (3), 2201-2207.
- 48) **Balci Ö.***, Ağaoğulları D., Duman İ., Öveçoğlu M. L. (2012). Synthesis of CaB₆ Powders via Mechanochemical Reaction of Ca/B₂O₃ Blends, *Powder Technology*, 225, 136-142.
- 49) Ağaoğulları D., **Balci Ö.**, Duman İ., Öveçoğlu M. L. (2011). Synthesis of α - and β -Rhombohedral Boron Powders via Gas Phase Thermal Dissociation of Boron Trichloride by Hydrogen, *Metallurgical and Materials Transactions B*, 42 (3), 568-574.

International Journal Articles and Proceedings (cited in Web of Science)

- 1) Khoshsima S., Altıntaş Z., Somer M., **Balci Ö.*** (2019). Synthesis of Cobalt-Nickel-Boron Based Composite Powders Using Metal Chloride Powder Blends, *Proceedings of 27th International Conference on Metallurgy and Materials*, 1563-1568.
- 2) **Balci Ö.***, Demirkan, Ö. U., Ağaoğulları, D., Gökçe, H., Genç, A., Öveçoğlu, M. L. and Duman, İ. (2013). Effects of La₂O₃ Addition on the Microstructure and Properties of Activated Sintered W-Ni Compacts, *Solid State Phenomena*, 194, 217-221.
- 3) Ağaoğulları, D., **Balci Ö.***, Demirkan, Ö.U., Gökçe, H., Genç, A., Öveçoğlu, M. L. and Duman, İ. (2013). Development of Mechanically Alloyed and Sintered W-1 wt.% Ni Matrix Composites Reinforced with TiB₂, *Solid State Phenomena*, 194, 194-198.
- 4) Gökçe, H., **Balci Ö.***, Ağaoğulları, D., Demirkan, Ö. U., Genç, A., Öveçoğlu, M. L. and Duman, İ. (2013). Characterization Investigations of W-Ni Matrix Composites Reinforced with TiB₂ and La₂O₃, *Acta Physica Polonica A*, 123 (2), 309-311.
- 5) Ağaoğulları, D., **Balci Ö.**, Öveçoğlu, M. L. and Duman, İ. (2013). Microstructure and Properties of Nanocrystalline LaB₆ Powders Synthesized in a High Energy Planetary Ball Mill, *Proceedings of 22nd International Conference on Metallurgy and Materials*, 1395-1400.
- 6) Ağaoğulları, D., **Balci Ö.** and Duman, İ. (2010). Mechanisms and Effects of various Reducing Agents on the Fabrication of Elemental Boron, *Proceedings of 19th International Conference on Metallurgy and Materials*, 748-752.

Book Chapters

- 1) Somer M., Acar S., **Balci Ö.***. (2020). Elemental Boron: General Properties and Industrial Production, *Boron and Materials Science Book*, Ed. Evis Z., National Boron Research Institute, Ankara.

Technical Reports

- 1) Maity T., Prashanth K.G., **Balci Ö.**, Cieslak G., Spsychalski M., Kulik T., Eckert J. (2020). High-entropy eutectic composites with high strength and low Young's modulus, *Material Design & Processing Communications*, DOI: 10.1002/mdp2.211.

Granted International Patents

- 1) "Production of Boron Carbide, Metal Carbide and/or Metal Boride at High Temperature and in Continuous Production Line", Inventors: Durmuş S., Akbaşak T., Somer M., Kiraz K., **Balci Ö.**, Çiçek B. Applicant: Ak-Kim Kimya Sanayi ve

Ticaret A.Ş., WIPO International Patent No: WO2020046229A3, International Search Report Published and Approved, 2.11.2020, World Intellectual Property Organization.

- 2) "A Reactor Designed for Chemical Vapor Deposition Method and Method of Producing Elemental Boron and Advanced Ceramic Powders with This Reactor", Inventors: Duman İ., Ağaoğulları D., **Balcı Ö.**, Öveçoğlu M. L., Applicant: National Boron Research Institute (BOREN), EPO International Patent No: EP 2735544B1, Granted on 12.10.2020, European Patent Office (Registered Patent with Examination).

Granted National Patents

- 1) "Production of Boron Carbide, Metal Carbide and/or Metal Boride at High Temperature and in Continuous Production Line", Inventors: Durmuş S., Akbaşak T, Somer M., Kiraz K., **Balcı Ö.**, Çiçek B. (2020). Applicant: Ak-Kim Kimya Sanayi ve Ticaret A.Ş., TPE National Patent No: TR 2018/12162, Granted on 23.11.2020, Turkish Patent and Trademark Office.
- 2) "A Reactor Designed for Chemical Vapor Deposition Method and Method of Producing Elemental Boron and Advanced Ceramic Powders with This Reactor", Inventors: Duman, İ., Ağaoğulları, D., **Balcı, Ö.** and Öveçoğlu, M. L. (2020). Applicant: National Boron Research Institute (BOREN), Granted TPE National Patent No: 2012/13720, Turkish Patent and Trademark Office.

National Articles (Ulakbim)

- 1) Altıntaş Z., Khoshsima S., Somer M., **Balcı Ö***. (2020). The synthesis of binary and ternary cobalt based metal borides by inorganic molten salt technique, *Journal of Boron*, 5 (1), 12-22.
- 2) Kiraz K., **Balcı Ö***, Çoşut Ö., Akbaşak T., Çiçek B., Somer M. (2019). The effect of different carbon sources on the phase formation and microstructure of boron carbide powders, *Journal of Boron*, 4 (2), 67-76.
- 3) **Balcı Ö***, Ağaoğulları D., Somer M., Öveçoğlu M.L. (2019). Effect of Ambient and Cryogenic Milling on the Microstructure and Properties of Tungsten Matrix Composites Fabricated by Activated Sintering, *Cumhuriyet Science Journal*, 40 (1) 204-212.
- 4) Ağaoğulları D., **Balcı Ö.**, Gökçe H., Ovalı D., Öveçoğlu M.L. (2019). Effects of TiB₂ And La₂O₃ Particle Reinforcements On The Tungsten Matrix Composites Fabricated By Mechanical Alloying And Activated Sintering, *Academic Journal of Engineering and Science*, 7 (1).
- 5) Ağaoğulları D., **Balcı Ö.**, Mertdinç S., Tekoğlu E., Öveçoğlu M.L. (2018). Synthesis of VB₂-V₃B₄-V₂B₃/VC hybrid powders via powder metallurgy processes, *Journal of Boron*, 3 (3) 180-187.
- 6) Rafieazad M., **Balcı Ö***, Acar S., Somer M. (2017). Review on magnesium diboride (MgB₂) as excellent superconductor: Effects of the production techniques on the superconducting properties, *Journal of Boron*, 2(2) 87-95.
- 7) **Balcı Ö***, Akçamlı N., Ağaoğulları D., Öveçoğlu M.L., Duman İ. (2017). Autoclave processing and sintering of ZrB₂-ZrO₂ powders and investigation of microstructural and some mechanical properties of bulk products, *Journal of Boron*, 2(1) 1-10.

Other National Articles

- 1) **Balcı, Ö*** and Ağaoğulları, D. (2016). Borür-Karbür Esasli Kompozit Tozların Ögütme Destekli Karbotermik Redüksiyon Yöntemi İle Ekonomik Yoldan Üretimi, *Metallurgy*, 178, 40-44.
- 2) **Balcı, Ö*** and Ağaoğulları, D. (2011). The Production of Some Metal Borides via Mechanochemical Synthesis and Mechanical Alloying, *Metallurgy*, 160, 26-30.
- 3) **Balcı Ö*** and Duman İ. (2010). A Review of the Production Techniques of Elemental Boron, *Metallurgy*, 156, 11-17.

Editorship

- 1) **Balcı-Çağırın Ö.** (2023). Guest Editor of Special Issue in the Journal *Crystals*, "Boron-Based Advanced Materials: Synthesis, Characterization and Properties", Basel, Switzerland.

* *Corresponding Author*

PRESENTATIONS

Invited Talks

- 1) **Balcı-Çağırın Ö.** (2023). Energy-based applications of boride nanoparticles, Max Planck Institute of Chemical Physics of Solids, February 23, Dresden, Germany. **SEMINAR.**

- 2) **Balci-Çağiran Ö.** (2022). Application areas of metal boride materials from academy to industry, *National Chemistry Summit*, November 8-9, İstanbul, Turkey. **INVITED TALK.**
- 3) **Balci-Çağiran Ö.** (2022). Low-cost and reusable iron- and nickel-based metal boride nanoparticles for sodium borohydride hydrolysis, *21th International Symposium on Boron, Borides and Related Materials, ISBB 2022*, September 5-9, Paris, France. **INVITED TALK.**
- 4) **Balci Ö.** (2021). Boron research at Koç University, *University Presentation*, March 10, İstanbul Technical University, İstanbul, Turkey. **SEMINAR.**
- 5) **Balci Ö.** (2019). New synthesis routes and properties of crystalline Co-M-B (M=Fe, Ti, Ni) nanoparticles, *Colloquium*, Invitation of Prof. Dr. Barbara Albert, Darmstadt Technical University, July 19, Darmstadt, Germany. **COLLOQUIUM SPEAKER.**
- 6) **Balci Ö.** (2019). Solid state production of metal matrix composites reinforced with advanced ceramic compounds, *Workshop on Advances in Solid State Chemistry and Physics & Nanoscience for Energy Harvesting Technologies*, September 27-28, Tsukuba, Japan. **INVITED TALK.**

Oral Presentations

- 1) **Balci Ö., et al.** (2019). Synthesis and magnetic properties of crystalline Co-Fe-B nanoparticles, *20th International Symposium on Boron, Borides and Related Materials, ISBB 2019*, September 22-27, Niigata, Japan.
- 2) **Balci Ö., et al.** (2019). Microstructural evolution and properties of in-house processed TiB₂ ceramics, *International Boron Symposium*, April 17-19, Nevşehir, Turkey.
- 3) **Balci Ö., et al.** (2017). Effect of SPS conditions on the sintering and microstructure of TiB₂, *19th International Symposium on Boron, Borides & Related Materials, ISBB 2017*, September 3-8, Freiburg, Germany.
- 4) **Balci Ö., et al.** (2014). Effects of excess boron source and reducing agent on the microstructure of vanadium and niobium borides, *18th International Symposium on Boron, Borides and Related Materials, ISBB 2014*, August 31 – September 5, Honolulu, Hawaii, USA.
- 5) **Balci Ö., et al.** (2014). Investigations on microstructural evolution of vanadium borides mechanically synthesized by using various amounts of V₂O₅, B₂O₃ and Mg, *International Conference on Structural Nano Composites, NANOSTRUC 2014*, May 20-21, Madrid, Spain.
- 6) **Balci Ö., et al.** (2013). Powder Metallurgy of Al-based Composites Reinforced with Fe-based Glassy Particles: Effect of Microstructural Modification, *ICMAT 2013: 7th International Conference on Materials for Advanced Technologies*, June 30 - July 5, Suntec, Singapore.
- 7) **Balci Ö., et al.** (2013). Effect of Mechanical Milling on the Microstructure of Niobium Boride Powders Synthesized by Magnesiothermic and Carbothermic Reductions, *ICMAT 2013: 7th International Conference on Materials for Advanced Technologies*, June 30 - July 5, Suntec, Singapore.
- 8) **Balci Ö., et al.** (2013). Synthesis of Calcium Boride Powders via Mechanochemical Route, *IFW Winterschool 2013*, January 20-23, Oberwiesenthal, Germany.
- 9) **Balci Ö., et al.** (2012). Influence of TiB₂ Particle Size on the Microstructure and Properties of Al Matrix Composites Prepared via Mechanical Alloying and Sintering, *ISMANAM 2012: 19th International Symposium on Metastable, Amorphous and Nanostructured Materials*, June 18-22, Moscow, Russia.
- 10) **Balci Ö., et al.** (2012). Effects of La₂O₃ Addition on the Microstructure and Properties of Activated Sintered W-Ni Compacts, *SCTE 2012: 18th International Conference on Solid Compounds of Transition Elements*, March 31 – April 5, Lisbon, Portugal.
- 11) **Balci Ö., et al.** (2011). A comparison between experiment results and predictions in BCl₃-H₂ system utilizing FTIR and FactSage modelling, *17th International Symposium on Boron, Borides and Related Materials, ISBB 2011*, September 11-17, İstanbul, Turkey.
- 12) **Balci Ö., et al.** (2011). Characterization Investigations of some magnesium borates fabricated from B₂O₃/MgO blends by mechanically activated annealing, *ECERS XII: 12th Conference of the European Ceramic Society*, June 19-23, Stockholm, Sweden (**Student Presentation Contest, Representative of Turkey**).
- 13) **Balci Ö., et al.** (2011). Carbothermal Production of ZrB₂-ZrO₂ Ceramic Powders from ZrO₂-B₂O₃/B System by High-Energy Ball Milling and Annealing, *Engineering Ceramics 2011 from Materials to Components*, May 8-12, Smolenice, Slovakia.
- 14) **Balci Ö., et al.** (2010). A Study on Crystallization Mechanism of Amorphous Boron, *METAL 2010: 19th International Conference on Metallurgy and Materials*, May 18-20, Roznov pod Radhostem, Czech Republic, EU.

- 15) **Balci, Ö.**, et al. (2009). The Production of HfO₂-HfB₂ Composite Powder from HfO₂, B₂O₃ and Mg by Solid State Reaction and Subsequent Annealing, *RCCSST 2009: 25th Regional Conference on Solid State Science & Technology 2009*, December 21-23, Penang, Malaysia.

Poster Presentations

- 1) Paksoy A., Arabi S., Kiraz K., Acar S., Somer M., **Balci-Çağırın Ö.** (2022). Production scale-up of boride-carbide micro/nanocomposites using elemental boron as precursor, *21th International Symposium on Boron, Borides and Related Materials, ISBB 2022*, September 5-9, Paris, France.
- 2) Khoshshima S., Altıntaş Z., Somer M., **Balci Ö.** (2019). The Conversion of Metal Chlorides to Cobalt-titanium-boron based Hybrid Nanostructures, *ICACC 2019, 43rd International Conference & Exposition on Advanced Ceramics and Composites*, Florida, USA.
- 3) **Balci Ö.**, et. al. (2018). Synthesis and characterization studies of nano-crystalline CoFeB₂ compound using inorganic molten salt technique, *30. National Chemistry Congress*, Gazimağusa, KKTC.
- 4) **Balci Ö.**, et al. (2015). "Microstructure and Mechanical Properties of the Sintered Niobium Borides", *IXth Ceramic Congress with International Participation*, November 26-28, Afyonkarahisar, Türkiye.
- 5) **Balci Ö.**, et al. (2014). Synthesis of niobium boride-niobium carbide powders via mechanical milling and annealing processes, *3th International Ceramic Glass Porcelain Enamel Glaze and Pigment Congress, SERES 2014*, October 15-17, Eskişehir, Turkey, **(POSTER AWARD)**.
- 6) **Balci Ö.**, et al. (2014). Characterization Investigations of Mechanochemically Synthesized VB₂, VB and V₃B₄ Powders, *17th International Metallurgy and Materials Congress, IMMC 2014*, September 11-13, İstanbul, Turkey.
- 7) **Balci, Ö.**, et al. (2012). Fabrication of W-1 wt.% Ni Matrix Composites Reinforced with TiB₂ and Y₂O₃ via Mechanical Alloying at Ambient/Cryogenic Conditions and Activated Sintering Methods, *ISNNM-2012: 12th International Symposium on Novel and Nano Materials*, August 26-30, Istanbul, Turkey.
- 8) **Balci, Ö.**, et al. (2012). Effects of Sequential Ball Milling at Ambient and Cryogenic Conditions on the Microstructure of W-1 wt.% Ni Compacts Reinforced with ZrC and Y₂O₃ Particles, *ISMANAM 2012: 19th International Symposium on Metastable, Amorphous and Nanostructured Materials*, June 18-22, Moscow, Russia.
- 9) **Balci, Ö.**, et al. (2011). A Comparative Study on the Synthesis and Characterization of CaB₆ Powders, *ECERS XII: 12th Conference of the European Ceramic Society*, June 19-23, Stockholm, Sweden.
- 10) **Balci, Ö.**, et al. (2010). Process Design for the Preparation of Micron-Scale Elemental Boron Powders by Chemical Vapor Deposition, *12th International Workshop on Nanoscience and Nanotechnology*, November 26-28, Varna, Bulgaria, **(POSTER AWARD)**.
- 11) **Balci, Ö.**, et al. (2009). Thermogravimetry / Differential Thermal Analyses and X-Ray Diffraction Studies on the Mechanochemical Reaction Mechanism of TiO₂-B₂O₃-Mg and Ti-B₂O₃-Mg Systems, *ROCAM 2009: The Sixth International Edition of Romanian Conference on Advanced Materials*, August 25-28, Brasov, Romania.
- 12) **Balci Ö.**, et al. (2008). Preparation of Ceramic Molds for Titanium Investment Casting, Process Design and Optimization, *14th International Metallurgy and Material Congress*, October 16-18, İstanbul, Turkey. Proceedings Book pp. 583-590. **(YOUNG SCIENTIST AWARD)**.

Presentations by Students and Colleagues (PostDoc, 2016 - current)

- 1) Paksoy A., Buldu-Aktürk M., Arabi S., Erdem E., **Balci-Çağırın Ö.** (2022). Synthesis and supercapacitor device performance of nanostructured ZrB₂ and ZrB₂-based nanocomposite materials, *21th International Symposium on Boron, Borides and Related Materials, ISBB 2022*, September 5-9, Paris, France. (Oral) **(BEST COMMUNICATION AWARD)**.
- 2) Khoshshima S., Altıntaş Z., Somer M., **Balci Ö.**, (2019). CoB-TiB₂ Composite Boride Powders: Single Step Synthesis and Characterization, *International Boron Symposium*, April 17-19, Nevşehir, Turkey. (Oral)
- 3) Altıntaş Z., Khoshshima S., Somer M., **Balci Ö.**, (2019). Effect of Precursor Concentration on the Formation of CoB-FeB Solid, Solutions Prepared Using Hydrous Metal Chlorides, *International Boron Symposium*, April 17-19, Nevşehir, Turkey. (Poster)
- 4) Kiraz K., **Balci Ö.**, Çoşut Ö., Akbaşak T., Çiçek B., Somer M. (2018). Synthesis of B₄C powders via different carbothermal reduction methods, *IV. Uluslararası Seramik, Cam, Emaye, Sır ve Boya Kongresi, SERES 2018*, Eskişehir, Turkey. (Oral)
- 5) Khoshshima S., Altıntaş Z., Somer M., **Balci Ö.**, (2018). Novel Synthesis of Cobalt Based Binary Boride Nanoparticles by Using Metal Chloride Powder Blends, *19th International Metallurgy and Materials Congress, IMMC 2018*, İstanbul, Turkey. (Oral)

- 6) Khoshshima S., Altıntaş Z., Somer M., **Balci Ö.**, (2018). Low temperature synthesis and microstructural characterization of semi-crystalline cobalt-iron-boron ternary metal boride nanostructures, *27th International Conference on Metallurgy and Materials METALS 2018*, Brno, Czech Republic. (Oral)
- 7) Khoshshima S., Altıntaş Z., Somer M., **Balci Ö.** (2018). Synthesis of cobalt-nickel-boron based composite powders using metal chloride powder blends, *27th International Conference on Metallurgy and Materials METALS 2018*, Czech Republic, 2018. (Poster)
- 8) Kiraz K., **Balci Ö.**, Çoşut Ö., Akbaşak T., Çiçek B., Somer M. (2018). Effect of different carbon sources on phase formation and microstructure in boron carbide powder synthesis, *30. National Chemistry Congress*, Gazimağusa, KKTC. (Poster)
- 9) Ağaogulları D., Mertdinç S., Tekoğlu E., **Balci Ö.**, Öveçoğlu M.L. (2017). In-situ formation of VB₂/VC composite powders from oxide raw materials via powder metallurgy processes, *ECerS2017, 15th Conference & Exhibition of the European Ceramic Society*, July 9–13, Budapest, Hungary. (Oral)
- 10) Ağaogulları D., **Balci Ö.**, Öveçoğlu M.L. (2016). Studies on the Fabrication and Characterization of Ni Activated Sintered W Composites Hybridized with Boride/Carbide/Oxide Particles, *ISMANAM 2016: 23rd International Symposium on Metastable, Amorphous and Nanostructured Materials*, July 3-8, Nara, Japan. (Oral)
- 11) Akçamlı N., **Balci Ö.**, Ağaogulları D., Öveçoğlu M.L., Duman İ. (2016). Low-temperature Synthesis and Consolidation of HfB₂-HfO₂ Powders”, *ISMANAM 2016: 23rd International Symposium on Metastable, Amorphous and Nanostructured Materials*, July 3-8, Nara, Japan. (Oral)

INTERNATIONAL/NATIONAL SCIENTIFIC EVENTS

Member of Scientific Committees

- 1) International Symposium on Boron, Borides and Related Materials, ISBB, Organizer: symposium held in a different university/country every two year
- 2) International Glass Conference, November 17-18, 2022, İstanbul Turkey, Organizer: ŞİŞECAM
- 3) International Boron Symposium, Organizer: TENMAK Boron Research Institute (BOREN)
 - a. BORON 2022, October 5-7, 2022, İstanbul Turkey
 - b. ICBOR 2019, April 17-19, 2019, Nevşehir Turkey

Organized Symposium / Workshop

- 1) 22nd International Symposium on Boron, Borides and Related Materials, ISBB 2024, 8 – 12 September 2024, İstanbul Turkey.
- 2) Workshop on the Metal Boride Applications, 18.09.2019, 10:00-16:30, Venue: Koç University, Presentations: Koç University, İstanbul Technical University, Pavtec Company, (18 Participants: Professors, Researchers, Students).

ADDITIONAL INFORMATION

Languages: Turkish (Native), English (Fluent), German (Intermediate)

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