



Dr. Önder Metin
Associate Professor of Chemistry
Department of Chemistry, Faculty of Science, Atatürk
University, Erzurum, TURKEY

Education: Dr. Önder Metin received his BSc in Chemistry from Cukurova University with the second honour degree in 2002. He then moved to Middle East Technical University (METU) in the context of “Faculty Growing Program (OYP)” and received his MSc in 2006 and PhD in 2010 at Department of Chemistry, Inorganic Chemistry Section, METU under the supervision of Prof. Dr. Saim Özkar. During his PhD studies, he studied as a TUBITAK research fellow at Department of Chemistry, Brown University (Rhode Island/USA) in 2009 and at Inorganic Chemistry Research Institute, Darmstadt Technical University in 2010. Next, he moved to Department of Chemistry, Atatürk University as an Assistant Professor in 2011. He then joined the research group of Prof. Shouheng Sun as a Post-Doctoral Research Associate in 2013 for one year. After post-doctoral studies, he turned back to Atatürk University and promoted to the Associate Professor degree in 2013.

Awards&Honors: Dr. Önder Metin has received numerous scientific awards and honors which of are selected and listed below;

1. Feyzi Akkaya Science Foundation (FABED), “*Eser Tumen Outstanding Young Scientist Award*”, **2015**.
2. The Prize Given for the Horizon-2020 Project Proposals Being above the Threshold of Consciousness, TUBITAK, **2015**.
3. Turkish Academy of Sciences “*The Highly Successful Young Scientists Award*” (TÜBA-GEB P), **2014**.
4. Middle East Technical University Prof. Dr. Mustafa N. PARLAR Education and Research Foundation Awards “*Research Encouragement Award*”, **2013**.
5. The Scientific and Technological Research Council of Turkey Fellow to attend “*63rd Lindau Nobel Laureates Meeting*”, Lindau, Germany, **2013**.
6. The Post-Doctoral Research Associate, Department of Chemistry, Brown University, **(2012-2013)**.
7. The 9th of Serhat ÖZYAR ‘Young Scientist of the Year Prize’, Middle East Technical University **(2011)**.

Academic Performance: Dr. Önder Metin has published 54 scientific papers with the total citations more than 2000 and h-index of 24. He has delivered more than 20 talks in the national and international conferences and meetings. He is a member of Turkish Catalysis Society, Turkish Chemical Society and Chemists Society. He is married and has a lovely son. He still studies at Department of Chemistry, Atatürk University on transition metal nanoparticles, bimetallic nanoparticles, nanocatalysis, graphene-based materials, hydrogen storage, electrocatalysis and rechargeable Li-air batteries.

Önder Metin, PhD

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1. Education:

Sept. 2006- Dec. 2010

PhD in Chemistry (Inorganic Chemistry) (GPA: 4.0/4.0)

Graduate School of Natural and Applied Sciences, Middle East
Technical University, Ankara, TURKEY

Thesis Title: Synthesis and Characterization of Water Soluble
Polymer-Stabilized Transition Metal(0) Nanoclusters as Catalyst in
Hydrogen Generation from the Hydrolysis of Sodium Borohydride
and Ammonia Borane

Supervisor: Prof. Dr. Saim ÖZKAR

Sept. 2004-June 2006

MSc in Chemistry, (Inorganic Chemistry) (GPA: 3.6/4.0)

Graduate School of Natural and Applied Sciences, Middle East
Technical University, Ankara, TURKEY

Thesis Title: “Synthesis and Characterization of
Hydrogenphosphate-stabilized Nickel(0) Nanoclusters as Catalysts
for the Hydrolysis of Sodium Borohydride”

Supervisor: Prof. Dr. Saim ÖZKAR

September 1998-July 2002

BSc in Chemistry (GPA: 3.2/4.0, second honor degree)

Faculty of Art and Science, Çukurova University, Adana, Turkey.

2. Professional appointments:

Associate Professor, October 2013-present

Department of Chemistry, Faculty of Science, Atatürk University, Erzurum, Turkey.

Assistant Professor, 2011-2013

Department of Chemistry, Faculty of Science, Atatürk University, Erzurum, Turkey.

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Post-Doctoral Research Associate, 2012-2013

Department of Chemistry, Brown University, Providence, RI 02906, USA

Advisor: Prof. Dr. Shouheng Sun

TUB TAK Research Project Fellow, July 2012-October 2012

Inorganic Chemistry Institute, Technical University of Darmstadt, Darmstadt, Germany. **Host**

Scientist: Prof. Dr. Jörg J. Schenider

TUBITAK 2214 Research Fellow, June 2009-December 2009

Department of Chemistry, Brown University, Providence, RI 02906, USA

Host Scientist: Prof. Dr. Shouheng Sun

Teaching/Research Assistant, 2004-2011

Department of Chemistry, Middle East Technical University, Ankara, Turkey.

3. Academic awards, honors and fellowships:

1. Atatürk University Rectory Scientific Encouragement Program “*The First Rank of the total Citation Category*”, **2016**.
2. Feyzi Akkaya Science Foundation (FABED), “*Eser Tumen Outstanding Young Scientist Award*”, **2015**.
3. The Prize Given for the Horizon-2020 Project Proposals Being above the Threshold of Consciousness, TUBITAK, **2015**.
4. Atatürk University Rectory Scientific Encouragement Program “*The First Rank of the Highest Impact Factor Paper Category*”, **2015**.
5. Turkish Academy of Sciences “*The Highly Successful Young Scientists Award*” (TÜBA-GEB P), **2014**.
6. Atatürk University Rectory Scientific Encouragement Program “*The First Rank of the Highest Impact Factor Paper Category*”, **2014**.
7. Middle East Technical University Prof. Dr. Mustafa N. PARLAR Education and Research Foundation Awards “*Research Encouragement Award*”, **2013**.
8. Atatürk University Rectory Scientific Encouragement Program “*The First Rank of the Highest Impact Factor Paper Category*”, **2013**.
9. The Scientific and Technological Research Council of Turkey Fellow to attend “*63rd Lindau Nobel Laurates Meeting*”, Lindau, Germany, **2013**.

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10. The Post-Doctoral Research Associate, Department of Chemistry, Brown University, (2012-2013).
11. Atatürk University Rectory Scientific Encouragement Program “*The First Rank of the Highest Impact Factor Paper Category*”, 2012.
12. The 9th of Serhat ÖZYAR ‘Young Scientist of the Year Prize’, Middle East Technical University (2011).
13. TUBITAK 2214-Research Fellow for Studying Abroad during PhD, 2009.

4. Teaching Experience:

Undergraduate Courses

As a teaching assistant at Middle East Technical University

General Chemistry Laboratory Instructor (3 semesters)

Inorganic Chemistry Laboratory Instructor (4 semesters)

Instrumental Analysis Laboratory Instructor (4 semesters)

As a Faculty at Atatürk University

2010-2011 Spring Inorganic Chemistry II

2010-2011 Spring Inorganic Chemistry Laboratory

2010-2011 Summer Inorganic Chemistry II

2011-2012 Fall Inorganic Chemistry I

2011-2012 Spring Inorganic Chemistry II

2011- 2012 Spring Inorganic Chemistry Laboratory

2012-2013 Summer Inorganic Chemistry I and II

2013-2014 Fall Inorganic Chemistry I

2013-2014 Spring Inorganic Chemistry II

2013- 2014 Spring Inorganic Chemistry Laboratory

2014-2015 Fall Inorganic Chemistry I (The lectures were given in English)

2014-2015 Spring Inorganic Chemistry II (The lectures were given in English)

2014- 2015 Spring Inorganic Chemistry Laboratory (The lectures were given in English)

Graduate Courses

2012-2013 Fall Advanced Inorganic Chemistry I

2012-2013 Spring Advanced Inorganic Chemistry II

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2013-2014 Fall	Advanced Inorganic Chemistry I
2013-2014 Fall	Transition Metal Nanoparticles in Catalysis (The lectures were given in English)
2013-2014 Spring	Advanced Inorganic Chemistry II
2014-2015 Fall	Advanced Inorganic Chemistry I

National/International Chemistry Olympiads

2011-present Inorganic Chemistry

5. Research Interests:

Nanomaterials synthesis and applications: synthesis and characterization of monometallic and bimetallic alloy or core-shell nanoparticles and their catalytic applications.

Nanocomposites: Preparation and characterization of different types of novel nanocomposites for various applications.

Heterogeneous Catalysis: application of heterogeneous catalysts in various organic and inorganic catalytic reactions

Catalytic reactions: hydrolysis of sodium borohydride, hydrolysis, methanolysis and dehydrogenation of ammonia-borane, formic acid dehydrogenation, Suzuki-Miyaura, Heck and Sonogashira C-C coupling reactions, hydrogenation of olefins and arenes, transfer hydrogenation, oxidation of alcohols, dihydroxylation of olefins and development of new energy efficient protocols for organic synthesis in the context of green chemistry.

Chemical Kinetics: Detailed reaction kinetics of various catalytic reactions

Graphene: Chemical route to synthesis of graphene and its use as catalyst support for transition metal nanoparticles.

Li-air batteries: Preparation of active cathode catalysts for the high-performance Li-air batteries

Photocatalysis: Photocatalytic dye removal and the applications photocatalytic processes in organic synthesis.

6. Services:

Community Services

Editor, Turkish Journal of Chemistry, 2013-present

Control Commission Member, Turkish Catalysis Society, 2013-present

Academic Consultant, City of Adana Water and Sewerage Works Management (ADANA ASK), 2015-present

Reviewer, *ACS Journals* (Journal of the American Chemical Society, ACS Nano, ACS Catalysis, ACS Applied Materials&Interfaces, Industrial&Engineering Chemistry Research, Journal of Physical Chemistry C), *Elsevier Journals* (Applied Catalysis B: Environmental, Applied Catalysis A: General, Journal of Molecular Catalysis A:Chemical, International Journal of Hydrogen Energy, Catalysis Today, Applied Surface Science), *RSC Journals* (Nanoscale , Journal of Materials Chemistry A, Journal of Materials Chemistry C, New Journal of Chemistry, Energy&Environmental Science, Catalysis Science&Technology, RSC Advances), *Wiley Journals* (Applied Organometallic Chemistry, ChemCatChem), *Springer Journals* (Reaction Kinetics, Mechanism, and Catalysis, Applied Organometallic Chemistry, Catalysis Letters).

(30 manuscripts reviewed in 2013, 49 manuscripts reviewed in 2014, 40 manuscript reviewed in 2015, 30 manuscripts have reviewed in 2016)

Academic Services:

Supervised Thesis (accomplished):

1. **Buket Kılıç**, Pd Nanoparticles Supported on Reduced Graphene Oxide: Preparation, Characterization and Catalytic Activity For Hydrolytic Dehydrogenation of Ammonia Borane *MSc Thesis, 08 June 2012.*
2. **Hasan Can**, A Facile Synthesis of Nearly Monodisperse Ruthenium Nanoparticles and Their Catalysis in The Hydrolytic Dehydrogenation Of Ammonia Borane for Chemical Hydrogen Storage, *MSc Thesis, 10 July 2013.*
3. **Sümeyra Diyarbakır**, Monodisperse Copper-Palladium Alloy Nanoparticles Assembled on Reduced Graphene Oxide as Highly Effective Catalysts for the Sonogashira Cross-Coupling Reactions, *MSc Thesis, 27 December 2014.*

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- 4. Nesibe Sedanur Çiftçi**, Monodisperse Nickel-Palladium Alloy Nanoparticles Supported on Reduced Graphene Oxide as Highly Efficient Catalysts for the Hydrolytic Dehydrogenation of Ammonia Borane, *MSc Thesis*, **02 January 2015**.
- 5. Katip Korkmaz**, Tandem Dehydrogenation of Ammonia Borane and Hydrogenation of Nitro/Nitrile Compounds Catalyzed by Graphene-Supported NiPd Alloy Nanoparticles, *MSc Thesis*, **08 January 2015**.
- 6. Kübra Güngörmez**, Cu₃Pd Alloy Nanoparticles Supported on Reduced Graphene Oxide as Active and Economical Catalysts for the Hydrolytic Dehydrogenation of Ammonia Borane, *MSc Thesis*, **15 January 2015**.

Supervised Thesis (Ongoing):

- 1. Hasan Can**, Bimetallic MRu (M: Co, Ni, Cu) Alloy Nanoparticles: Synthesis, Characterization and Catalytic Applications, *PhD Thesis*, **2013-**
- 2. Melike Sevim**, The Development of a New Generation Active Cathode Catalysts for The Li-Air Batteries, *PhD Thesis*, **2013-**
- 3. Gül ah Çelikda**, The use of Graphene/Graphene Oxide-CoFe₂O₄ Nanoparticles Hybrid Materials as Adsorbents for the Organic Dye Removal from Aqueous Solutions, *MSc Thesis*, **2014-**

7. Projects/Grants

Ongoing:

- (i) Researcher;** Investigation of Damping and Fatigue Behaviour of Nanoparticle Reinforced Laminated Composites Subjected to Low Velocity Impact, TÜBİTAK 1001 PROJECT, 2015-2017 (186.000 TL).
- (ii) Researcher;** Determination of zinc, one of the vital bioelements, with spectrofluorimetric method by using the Fe₃O₄/SiO₂-NH₂ nanocomposite functionalized with Znpyr-1 ligand in artificial saliva, TÜBİTAK 3001 Project, 2015-2015, (60.000 TL)
- (iii) Project leader;** The Synthesis of Magnetically Recoverable Graphene/Graphene oxide Base Nanocomposites and Their Performance in the Organic Dye Removal From Aqueous Solution, Atatürk University Research Projects Council, 2016-2018 (30.000 TL).

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Accomplished:

(i) **PhD Fellow**, Water Soluble Polymer-Stabilized Nickel(0) and Cobalt(0) Nanoclusters: Synthesis, Characterization and Catalytic Use, TÜB TAK 1001 Project, 2008-2010 (98.000 TL)

(ii) **Project Leader**, Polymer stabilized transition metal nanoclusters as catalysts, METU BAP-08-11-DPT2002K120510, 2006-2010 (Bütçe: 40.000 TL)

(iii) **PhD Research Fellow**; TÜB TAK-107M447- INTEN-C projesi, 2010.

(iv) **Project Leader**; Palladium Nanoparticles Supported on Chemically Derived Graphene: Synthesis, Characterization and Catalytic Activity in the Dehydrogenation of Ammonia Borane, Atatürk University Research Projects Council, 2011-2013 (35.000 TL).

(v) **Project Leader**; Synthesis and Characterization of FeAuPd and FeAgPd Alloy Nanoparticles as Catalyst for the Formic Acid Dehydrogenation under Mild Conditions, Atatürk University, Research Projects Council, 2013-2015. (35.000 TL).

(vi) **Project Leader**; Synthesis and Characterization of Monodisperse Alloy and Core-Shell Bimetallic Palladium Nanoparticles and Their Catalysis for the Selective Reduction of Nitroarenes via Transfer Hydrogenation, TÜBITAK Career Project, 2013-2015. (205.000 TL).

Submitted:

(i) **Project Leader**; Bimetallic Ruthenium Alloy Nanoparticles Supported on Graphene as Highly Efficient, Economical and Reusable Catalysts: Synthesis, Characterization and Catalytic Applications, TÜB TAK ARDEB-1001 Project, 2016-March

(ii) **Researcher**; Synthesis, Characterization of N-heterocyclic Carbene-Stabilized Metal Nanoparticles and Their Catalytic Applications, TÜB TAK ARDEB-1001 Project, 2016-March.

(v) **Consultant**; Carbon-Based Tandem Broadband Photocatalytic Nano-Architectures, TÜB TAK ARDEB-1001 Project, 2016-March.

8. Patents

1) Wenlei Zhu, Ronald Michalsky, **Önder Metin**, Christopher Wright, Haifeng Lv, Shaojun Guo, Andrew A. Peterson, Shouheng Sun, Au Nanoparticles for CO₂ Reduction, U.S. Patent, Application No: 61/883,727, pending.

9. Journal Publications (in reverse chronological order)

Total Citations (Web of Science)= 1690, h-index= 23 (19 June 2016), link to WOS;
http://apps.webofknowledge.com/CitationReport.do?product=UA&search_mode=CitationReport&SID=Z1YWJqYx9dSI3oqUSps&page=1&cr_pqid=2&viewType=summary

Total Citations (Google Scholar)= 2114, h-index= 24, i-index= 32 (01 June 2016), link to google scholar citations: <https://scholar.google.com/citations?user=4eVXemOAAAAJ&hl=en>

(1 paper | 200 citations, 6 papers | 100 citations, 9 papers | 50 citations)

*Corresponding Author

55. M. Sinoforoglu, Melike Sevim, Murat Ate , Kadem Meral, **Önder Metin***, ZnO nanoplates assembled on reduced graphene oxide as high performance electrode material for supercapacitors, *Journal of Power Sources*, **2016**, *under review*.

54. J.A.S.B. Cardoso, D.S.P. Cardoso , L. Amaral , **Ö. Metin***, M. Sevim, T. Sener, C.A.C. Sequeira, D.M.F. Santos,* Reduced graphene oxide assembled Pd-based nanoalloys for hydrogen evolution reaction, *International Journal of Hydrogen Energy*, **2016**, *under review*.

53. **Önder Metin***, Adriana Mendoza-Garcia, Di dem Dalmızrak, Mehmet Serdar Gültekin, Shouheng Sun, FePd Alloy Nanoparticles Assembled on Reduced Graphene Oxide as Catalyst for Selective Transfer Hydrogenation of Nitroarenes to Anilines Using Ammonia Borane as a Hydrogen Source, *Catalysis Science&Technology*, **2016**, doi: 10.1039/C6CY00118A.

52. Marta Martins, Biljana Sljukic, César Sequeira, **Önder Metin**, Mehmet Erdem, Tansel Sener, Diogo Santos, Biobased carbon-supported palladium electrocatalysts for borohydride fuel cells, *International Journal of Hydrogen Energy*, **2016**, doi:10.1016/j.ijhydene.2016.04.039.

51. Melike Sevim; Carlotta Francia; Julia Amici; Svetoslava Vankova; Tansel Sener; **Önder Metin***, Bimetallic MPt (M: Co, Ni, Cu) Alloy Nanoparticles Assembled on Reduced Graphene Oxide as High Performance Cathode Catalysts for Rechargeable Lithium-Oxygen Batteries, *Journal of Alloys and Compounds*, **2016**, 683, 231-240.

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50. Ali R. Deniz; Zakir Çaldıran; **Önder Metin**; Kadem Meral, Zakir Aydoğan, The Investigation of the Electrical Properties of Fe₃O₄/n-Si Heterojunctions in a Wide Temperature Range, *Journal of Colloid and Interface Science*, **2016**, *473*, 172–181

49. Deniz Altunoz Erdogan, Melike Sevim, Ezgi Kısa, Dilara Borte Emiroglu, Mustafa Karatok, Evgeny I. Vovk, Morten Bjerring, Ümit Akbey, **Önder Metin**,* Emrah Ozensoy, Photocatalytic Activity of Mesoporous Graphitic Carbon Nitride (mpg-C₃N₄) Towards Organic Chromophores under UV and VIS Light Illumination, *Topics in Catalysis*, **2016**, *accepted for publication* (Special Issue “Energy-related Catalysis”) *but has not received the doi number.*

48. Yasin Çetinkaya, **Önder Metin**, Metin Balcı, Reduced Graphene Oxide Supported Nickel-Palladium Alloy Nanoparticles as a Superior Catalyst for the Hydrogenation of Alkenes and Alkynes under Ambient Conditions, *RSC Advances*, **2016**, *6*, 28538-28542.

47. Merve Arslanda, **Önder Metin***, Murat Acar, Yavuz Onganer, Kadem Meral, The interaction of fluorescent Pyronin Y molecules with monodisperse silver nanoparticles in chloroform, *Journal of Molecular Structure*, **2016**, *1103*, 212-216.

46. Feyyaz Durap, **Önder Metin***, Monodisperse Palladium Nanoparticles Supported on Chemically Derived Graphene: Highly Active and Reusable Nanocatalysts for Suzuki–Miyaura Cross-Coupling Reactions, *Turkish Journal of Chemistry (invited paper)*, **2015**, *39*, 1247-1256.

45. Khadijeh Ganjehyan, Bilal Nişancı, **Önder Metin***, Arif Dağtan, Bela Török, Graphene-Supported NiPd Alloy Nanoparticles: A Novel and Highly Efficient Heterogeneous Catalyst System for the Reductive Amination of Aldehydes, *Journal of Molecular Catalysis A:Chemical*, **2015**, *409*, 191-197.

44. Melike Sevim, Tansel Şener, **Önder Metin***, Monodisperse MPd (M: Co, Ni, Cu) Alloy Nanoparticles Supported on Reduced Graphene Oxide as Cathode Catalysts for the Lithium-Air Battery, *International Journal of Hydrogen Energy*, **2015**, *40*, 10876-10882.

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43. Tansel Ener, Melike Sevim, Emine Kayhan, **Önder Metin***, Monodisperse CoFe₂O₄ nanoparticles supported on Vulcan XC-72: High performance electrode materials for Lithium-air and Lithium-ion batteries, *Journal of Power Sources*, **2015**, 288, 36-41.
42. A.R. Deniz, Z. Çaldıran, F. Mehmet Çökün, K. Meral, Şakir Aydoğan, **Ö. Metin***, Space charge limited current mechanism (SCLC) in the Graphene oxide-Magnetite Nanocomposites/n-Si heterojunctions, *Journal of Alloys and Compounds*, **2015**, 631, 261-265.
41. Kübra Güngörmez, **Önder Metin***, Composition-controlled catalysis of reduced graphene oxide supported CuPd alloy nanoparticles in the hydrolytic dehydrogenation of ammonia borane, *Applied Catalysis A:General*, **2015**, 494, 22-28.
40. Sümeyra Diyarbakır, Hasan Can, **Önder Metin***, Reduced Graphene Oxide-Supported CuPd Alloy Nanoparticles as Efficient Catalysts for the Sonogashira Cross-Coupling Reactions, *ACS Applied Materials & Interfaces*, **2015**, 7, 3199-3206.
39. Haydar Göksu, Hasan Can, Kıvılcım İncel, Mehmet Serdar Gültekin, **Önder Metin***, CoPd alloy nanoparticles catalyzed tandem ammonia borane dehydrogenation and reduction of aromatic nitro, nitrile and carbonyl compounds, *Applied Catalysis A:General*, **2014**, 488, 176-182.
38. N. Sedanur Çiftçi, **Önder Metin***, Monodisperse nickel-palladium alloy nanoparticles supported on reduced graphene oxide as highly efficient catalysts for the hydrolytic dehydrogenation of ammonia borane, *International Journal of Hydrogen Energy*, **2014**, 39, 18863-18870.
37. Zeki Çaldıran, Ali R. Deniz, **Önder Metin**, Hasan Can, Kadem Meral, Şakir Aydoğan, Schottky diode performance of an Au/Pd/GaAs device fabricated by deposition of monodisperse palladium nanoparticles over a p-type GaAs substrate, *Materials Science in Semiconductor Processing*, **2014**, 27, 163-169.

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36. Kadem Meral, **Önder Metin***, Graphene Oxide-Magnetite Nanocomposite as an Efficient and Magnetically Separable Adsorbent for Methylene Blue Removal from Aqueous Solution, *Turkish Journal of Chemistry*, **2014**, 38, 775-782.
35. Sally Ho, Adriana Mendoza Garcia, Shaojun Guo, Dong Su, Sheng Liu, Önder Metin, Shouheng Sun, A General Approach to Monodisperse MPd (M = Co Cu) Alloy Nanoparticles and Their Catalysis for Electrooxidation of Formic Acid, *Nanoscale*, **2014**, 6, 6970-6973.
34. Haydar Göksu, Sally Fae Ho, **Önder Metin***, Katip Korkmaz, Adriana Mendoza Garcia, Mehmet Serdar Gültekin, Shouheng Sun, Tandem Dehydrogenation of Ammonia Borane and Hydrogenation of Nitro/Nitrile Compounds Catalyzed by Graphene-Supported NiPd Alloy Nanoparticles, **2014**, 4, 1777-1782.
33. **Önder Metin**, akir Aydo an, Kadem Meral, A New Route for the Preparation of Graphene Oxide-Fe₃O₄ Nanocomposites and Their Schottky Diode Applications. *Journal of Alloys and Compounds*, **2014**, 585, 681-688.
32. Wenlei Zhu, Ronald Michalsky, **Önder Metin**, Christopher Wright, Haifeng Lv, Shaojun Guo, Xiaolian Sun, Andrew A. Peterson, Shouheng Sun, Monodisperse Au Nanoparticles for Selective Electroreduction of CO₂ to CO, *Journal of the American Chemical Society*, **2013**, 135 (45), 16833-16836.
- 31- Haydar Göksu, Di dem Dalmızrak, Serdar Akbayrak, Mehmet Serdar Gültekin, Saim Özkar, **Önder Metin***. One-Pot Synthesis of 1,2/3-triols from Allylic Hydroperoxides Catalyzed by Zeolite-Confined Osmium(0) Nanoclusters. *Journal of Molecular Catalysis A:Chemical*, **2013**, 378, 142-147.
30. Zakir Çaldıran, Ali Rıza Deniz, **Önder Metin**, Kadem Meral, akir Aydo an, The Synthesis of the Fe₃O₄ nanoparticles and the analysis of the current-voltage measurements on Au/Fe₃O₄/p-Si Schottky contacts in a wide temperature range, *Metalurgical and Materials Transactions A* **2013**, 44, 3809-3814.

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29. Sen Zhang, **Önder Metin***, Dong Su, Shouheng Sun, Monodisperse AgPd Alloy Nanoparticles and Their Superior Catalysis in Formic Acid Dehydrogenation. *Angewandte Chemie International Edition (VIP paper)*, **2013**, 52, 3681-3684.

28. Sibel Duman, **Önder Metin***, Saim Özkar, B-N Polymer Embedded Iron(0) Nanoparticles as Highly Active and Long Lived Catalyst in the Dehydrogenation of Ammonia Borane. *Journal of Nanoscience and Nanotechnology*, **2013**, 13, 4954-4961.

27. **Önder Metin**, Xiaolian Sun, Shouheng Sun, Monodisperse Gold-Palladium Alloy Nanoparticles and Their Composition-Controlled Catalysis in Formic Acid Dehydrogenation Under Mild Conditions. *Nanoscale*, **2013**, 5, 910-912.

26. **Önder Metin***, Sally F. Ho, Cemalettin Alp, Hasan Can, M. Serdar Gültekin, M. Chi, Shouheng Sun, Ni/Pd Core/Shell Nanoparticles Supported on Graphene as a Highly Active and Reusable Catalyst for Suzuki-Miyaura Cross-Coupling Reaction *Nano Research*, **2013**, 1, 10-18. (Selected as one of the Top Ten Papers Award published in 2013-2015)

25. Zakir Çaldıran, A. Rıza Deniz, **Önder Metin**, Kadem Meral, Akir Aydın, The Electrical Characteristics of the Fe₃O₄/Si heterojunctions, *Journal of Alloy and Compounds* **2013**, 552, 437-442.

24. Dahou Sun, Vismadeb Mazumder, **Önder Metin**, Shouheng Sun, Methanolysis of Ammonia Borane by CoPd Nanoparticles. *ACS Catalysis* **2012**, 2, 1290-1295.

23. Hasan Can, **Önder Metin***. A Facile Synthesis of Nearly Monodisperse Ruthenium Nanoparticles and Their Catalysis in the Hydrolytic Dehydrogenation of Ammonia Borane for Chemical Hydrogen Storage. *Applied Catalysis B: Environmental* **2012**, 125, 304-310.

22. Kılıç, B.; İncanlı, S.; **Önder Metin*** Hydrolytic Dehydrogenation of Ammonia Borane Catalyzed by Reduced Graphene Oxide Supported Monodisperse Palladium Nanoparticles: High

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Activity and Detailed Reaction Kinetics. *Journal of Molecular Catalysis A: Chemical*, **2012**, 361-362, 104-110.

21. Önder Metin*, Nurdan C. Alp, Serdar Akbayrak, Abdullah Biçer, M. Serdar Gültekin, Saim Özkar, U ur Bozkaya, Dihydroxylation of Olefins Catalyzed by Zeolite-Confined Osmium(0) Nanoclusters: An Efficient and Reusable Method for the Preparation of 1,2-*cis*-Diols. *Green Chemistry* **2012**, 14, 1488-1492.

20. Önder Metin*, Emine Kayhan, Saim Özkar, Jörg J. Schneider, Palladium Nanoparticles Supported on Chemically Derived Graphene: An Efficient and Reusable Catalyst for the Dehydrogenation of Ammonia Borane. *International Journal of Hydrogen Energy* **2012**, 37, 8161-8169.

19. Vismadeb Mazumder, Mifang Chi, Max Mankin, **Önder Metin**, Dong Su, K.L. More, Shouheng Sun, A Facile Synthesis of MPd (M = Co, Cu) Nanoparticles and Their Catalysis for Formic Acid Oxidation. *Nano Letters* **2012**, 12, 1102-1106.

18. Melek Dinç, **Önder Metin**, Saim Özkar, Water Soluble Polymer Stabilized Iron(0) Nanoclusters: A Cost-Effective and Magnetically Recoverable Catalyst for Hydrogen Generation from the Hydrolysis of Sodium Borohydride and Ammonia Borane, *Catalysis Today*, **2012**, 183, 10-16.

17. Önder Metin, Melek Dinç, Zeynep S. Eren, Saim Özkar, Silica Embedded Cobalt(0) Nanoclusters: Efficient, Stable and Cost-Effective Catalyst for Hydrogen Generation from the Hydrolysis of Ammonia Borane, *International Journal of Hydrogen Energy*, **2011**, 36, 11528-11535.

16. Dahou Sun, Vismadeb Mazumder, **Önder Metin**, Shouheng Sun, Catalytic Hydrolysis of Ammonia Borane via Cobalt Palladium Nanoparticles. *ACS Nano* **2011**, 8, 6458-6464.

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15. Önder Metin, Sibel Duman, Melek Dinç, Saim Özkar, In Situ Generated Oleylamine Stabilized Palladium(0) Nanoclusters as Highly Active Heterogeneous Catalyst for the Dehydrogenation of Ammonia Borane. *Journal of Physical Chemistry C* **2011**, *115*, 10736-10743.

14. Önder Metin*, Ebru Koçak, Saim Özkar, Effect of Stabilizer Type on the Activity of Cobalt(0) Nanoclusters as Catalyst in Hydrogen Generation from the Hydrolysis of Sodium Borohydride, *Reaction Kinetics, Mechanisms and Catalysis*, **2011**, *103*, 325-340.

13. Önder Metin*, Feyyaz Durap, Murat Aydemir, Saim Özkar, Palladium(0) Nanoclusters Stabilized by Poly(4-styrenesulfonic acid-co-maleic acid) as an Effective Catalyst in Suzuki-Miyaura Cross-Coupling Reactions in Water, *Journal of Molecular Catalysis A: Chemical*, **2011**, *337*, 39-44.

12. Huriye Erdogan, Önder Metin, Saim Özkar, In-Situ Generated Polymer Stabilized Ruthenium(0) Nanoclusters: An Effective Catalyst in the Hydrogen Generation from the Methanolysis of Ammonia Borane, *Catalysis Today*, **2011**, *170*, 93-98.

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6. **Önder Metin**, İsmail Sahin, Saim Özkar, Water-soluble Poly(4-styrenesulfonic acid-co-maleic acid)-stabilized Ruthenium(0) and Palladium(0) Nanoclusters as Highly Active Catalysts in Hydrogen Generation from the Hydrolysis of Ammonia Borane, *International Journal of Hydrogen Energy*, **2009**, *34*, 6304-6313.
5. **Önder Metin**, Saim Özkar, Hydrogen Generation from the Hydrolysis of Ammonia borane and Sodium Borohydride Using Water-soluble Polymer-Stabilized Cobalt(0) Nanoclusters Catalyst, *Energy&Fuels*, **2009**, *23*, 3517-3525.
4. **Önder Metin**, Saim Özkar, Synthesis and Characterization Of Poly(N-Vinyl-2-pyrrolidone)-Stabilized Water-Soluble Nickel(0) Nanoclusters as Catalyst for The Hydrolysis of Sodium Borohydride, *Journal of Molecular Catalysis A: Chemical*, **2008**, *295*, 39-46.
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2. **Önder Metin**, Leyla Tatar Yıldırım, Saim Özkar, Synthesis, Characterization and Crystal Structure of Bis(acetylacetonato)dimethanolnickel(II): [Ni(acac)₂(MeOH)₂], *Inorganic Chemistry Communications*, **2007**, *10*, 1121-1123.

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1. **Önder Metin**, Saim Özkar, Hydrogen Generation From The Hydrolysis Of Sodium Borohydride By Using Water-dispersible Hydrogenphosphate-stabilized Nickel(0) Nanoclusters As Catalyst, *International Journal of Hydrogen Energy*, **2007**, 32, 1707-1715.

9. Invited Talks:

1) Hydrogen Production from Chemical Hydrogen Storage Materials Using Transition Metal Nanocatalysts, *Department of Chemistry, Brown University*, 21 November 2012.

2) Drinking Water Disinfection Technologies, *1st Adana Water Summit*, 22 March 2015 (World Water Day), Adana, Turkey.

3) Composition-Controlled Catalysis of MPd (M: Fe, Co, Ni, Cu) Alloy Nanoparticles, *V. National Inorganic Chemistry Congress*, 22-25 April 2015, Mersin, Turkey.

4) Transition Metal Nanoparticles as Catalysts, *27. National Chemistry Conference*, 23-28 August 2015, Çanakkale, Turkey.

5) Catalysis with Transition Metal Nanoparticles, Department of Chemistry, Gebze Technical University, 21 January 2016, Gebze, Turkey

6) Are we drinking a water or poison? The Chemistry and importance of Drinking Water Disinfection, *2nd Adana Water Summit*, 22 March 2016 (World Water Day), Adana, Turkey.

7) Nanocatalysis: From Theory to Applications, Nanotechnology Research and Application Center, Sabancı University, 06 May 2016, İstanbul, Turkey

10. International Symposium Presentations (in reverse chronological order):

19. **Önder Metin**, Melike Sevim, Tansel Ener, Monodisperse MPd (M: Co, Ni, Cu) Alloy Nanoparticles Supported on Reduced Graphene Oxide as Cathode Catalysts for the Lithium-Air Battery, *Advances in Functional Materials*, 29 Haziran-3 Temmuz 2015, Stony Brook University, New York, USA. (Oral)

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18. Kübra Güngörmez, Melike Sevim, **Önder Metin**, A Facile Route to Monodisperse Copper-Silver (CuAg) Alloy Nanoparticles and Their Catalysis in Hydrogen Generation from the Hydrolysis of Ammonia-Borane , *NANO2014*, 13-18 Temmuz 2014, Moskova, Rusya. (Poster)
17. Sümeýra Diýarbakır, Hasan Can, **Önder Metin**, Monodisperse CuPd Alloy Nanoparticles Supported on Graphene as Highly Efficient Catalysts for the Sonogashira Cross-Coupling Reactions, *NANO2014*, 13-18 Temmuz 2014, Moskova, Rusya. (Poster)
16. **Önder Metin**, Haydar Göksu, Sally Fae Ho, M.s Serdar Gültekin, Shouheng Sun, A Facile Route to Monodisperse MPd (M = Co, Ni) Alloy Nanoparticles and Their Catalysis in the Reduction of Aromatic Nitro/Nitrile Compounds, *NANO2014*, 13-18 Temmuz 2014, Moskova, Rusya. (Oral)
15. Zhu, W.; **Metin, Ö.**; Wright, C.; Sun, S. Electrocatalytic reduction of CO₂ to CO by monodisperse Au nanoparticles, *246th National Meeting of the American-Chemical-Society (ACS)*, 08-12 Eylül, 2013, Indianapolis, ABD. (Poster)
14. Ho, S.; **Metin, Ö.** Adriana Mendoza Garcia, Shouheng Sun, Rational Design of Nickel Palladium (NiPd) Nanoparticles for Catalysis, *2013 MRS Fall Meeting*, 01-06 Aralık 2013, Boston, MA, ABD. (Oral)
13. **Metin, Ö.**; **Can, H.** A Facile Synthesis of Nearly Monodisperse Ruthenium Nanoparticles and Their Catalysis in the Hydrolytic Dehydrogenation of Ammonia Borane for Chemical Hydrogen Storage. *NanoFormulation2012*, 28 Mayıs- 01 Haziran 2012, Barselona, spanya. (Poster)
12. **Metin, Ö.**; Sun, D.; Sun, S. “Monodisperse Cobalt Palladium Nanoparticles and Their Composition Controlled Catalysis in the Hydrolysis of Ammonia Borane.” *4th National Catalysis Conference*, 21-24 March 2012, zmit/Turkey. (Oral)

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11. **Metin, Ö.;** Zahmakıran, M.; Ayvalı, T.; Dinç, M.; Özkar, S. “Transition metal nanoparticles as catalyst in hydrogen generation from boron based compounds.” *International Conference on Hydrogen Production (ICH₂P-11)*, 19-22 June 2011, Thessaloniki/Greece. **(Oral)**
10. **Metin, Ö.;** Duman, S.; Özkar, S. “Oleylamine Stabilized Palladium(0) Nanoclusters as Highly Active Heterogeneous Catalyst for the Dehydrogenation of Ammonia Borane.” *International Conference on Hydrogen Production (ICH₂P-11)*, 19-22 June 2011, Thessaloniki/Greece **(Poster)**.
9. **Metin, Ö.;** Özkar, S.; Sun, S. Monodisperse Nickel Nanoparticles on SiO₂ as an Effective Catalyst in the hydrolysis of Ammonia Borane, *11st International Chemistry Conference and Exhibition in Africa (11 ICCA)*, November 20-23, 2010, Luxor, Egypt. **(Oral)**
8. **Metin, Ö.;** Mazumder, V.; Özkar, S.; Sun, S. Monodisperse Nickel Nanoparticles and Their Catalysis in Hydrolytic Dehydrogenation of Ammonia Borane, *1st International Conference on Materials for Energy*, July 4-8, 2010, Karlsruhe, Germany. **(Oral)**
7. **Metin, Ö.;** Özkar, S. Water-soluble Poly(4-styrenesulfonic acid-co-maleic acid)-stabilized Nickel(0) and Cobalt(0) Nanoclusters as Highly Active Catalysts in Hydrogen Generation from the Hydrolysis of Ammonia borane, *Mater. Res. Soc. 2009 Fall Meeting*, November 30 - December 4, 2009, Boston, USA. **(Poster)**
6. Ün, S.S.; **Metin, Ö.;** Özkar, S. Water-soluble Poly(4-styrenesulfonic acid-co-maleic acid)-stabilized Ruthenium(0) and Palladium(0) Nanoclusters as Highly Active Catalysts in Hydrogen Generation from the Hydrolysis of Ammonia borane, *13th European Conference on Applications of Surface and Interface Analysis (ECASIA-09)*, October 18-23, 2009, Antalya/TURKEY. **(Poster)**
5. Ünel, E.; **Metin, Ö.;** Özkar, S. Synthesis and Characterization of Water-Soluble Polymer-Stabilized Ruthenium(0) Nanoclusters as Catalyst in Hydrogen Generation from the Hydrolysis

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of Sodium Borohydride, *13th European Conference on Applications of Surface and Interface Analysis (ECASIA-09)*, October 18-23, 2009, Antalya/TURKEY. **(Poster)**

4. Erdogan, H.; **Metin, Ö.**; Özkar, S.; Hydrogen Generation from the Methanolysis of Ammonia Borane Catalyzed by In Situ Generated PVP Stabilized Palladium(0) Nanoclusters. *13th European Conference on Applications of Surface and Interface Analysis (ECASIA-09)*, October 18-23, 2009, Antalya/TURKEY. **(Poster)**
3. **Metin, Ö.**; Özkar, S. Synthesis and Characterization Of Poly(N-Vinyl-2-pyrrolidone)-Stabilized Water-Soluble Nickel(0) Nanoclusters as Catalyst for The Hydrolysis of Sodium Borohydride, *10th Young Chemist Conference on Chemistry*, March 27-29, 2008, Rostock/Germany. **(Poster)**
2. **Metin, Ö.**; Özkar, S. Hydrogen Generation From The Hydrolysis Of Sodium Borohydride By Using Nickel(0) Nanoclusters as Catalyst, *3rd International Boron Symposium*, November 02-04, 2006, Ankara/TURKEY. **(Oral)**
1. **Metin, Ö.**; Özkar, S, Synthesis and Characterization of Water-Dispersible Nickel(0) Nanoclusters As Catalyst For The Hydrolysis Of Sodium Borohydride, *International Workshop on Nanostructured Materials (NANOMAT)*, June 21-23, 2006, Antalya/TURKEY. **(Poster)**

Title:

Reduced Graphene Oxide as a Versatile Support Material for the Nanocatalysts

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Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Transition metal nanoparticles (TMNPs) have rather large surface area and catalytically more active surface atoms than bulk metals, which is one of the most important reasons behind their widely usage. Therefore, they have been preferentially used as catalysts in various catalytic reactions and show advantageous catalytic properties compared to those of homogeneous and heterogeneous analogues. Therefore, the new term, "Nanocatalysis", is raised and growing fast. However, TMNPs are kinetically unstable against to agglomeration and thus they have to be stabilized either by using long chain ligands or by supporting them on suitable large surface area host materials to be efficiently used in the catalysis. Large surface area carbon-based materials are widely used as the host materials for the TMNPs. Among those carbon materials, reduced graphene oxide (rGO) has attracted many scientists in the catalysis area as a versatile support material because of its 2D structure formed by sp²-hybridized carbon atoms, high conductivity and of course very large surface area.

Besides the monometallic nanoparticles, the interest in the use of bimetallic nanoparticles instead of monometallic ones has been increased recently because the bimetallic TMNPs either in alloy or core-shell form show higher activity, selectivity and stability compared to the monometallic counterparts owing to the "Synergistic" effects formed between two distinct metal atoms. In particular, economical catalysts could be developed by the preparation of bimetallic alloy or core-shell nanoparticles of noble metals with a non-noble metal, which is considered to be very advantageous for the catalytic reactions using noble metals as catalyst.

In this talk, I will present our recent research activities on the synthesis of rGO supported monometallic and bimetallic nanoparticles and their various catalytic applications comprising the organic, inorganic and electrochemistry.