DEPARTMENT of PHOTONICS
IZTECH

REPORT
(2017-2018)

http://photonics.iyte.edu.tr/ email: fotonik@iyte.edu.tr
Address: İzmir YüksekTeknolojiEnstitüsü Fen Fakültesi Dekanlığı Gülbahçe 35430 URLA/İZMİR

Table of Contents

Preface

Department of Photonics, the first one in Turkey, was established in 2015 as a part of academic expansion of Izmir Institute of Technology to develop new emerging technologies to shape up the next century and train students in the field of photonics that is active in many industrial sectors. To this end, the department fosters research and graduate education. Each academic semester we offer 10+ graduate courses for the enrolled students as well as others. We are in the phase of establishing an optic and photonic lab covering more than 25 experiments to train students.

You will find the details of our endeavors on research and training of graduate students in the following pages of the report. In short, the department secured more than 3 million TL research money from external sources (mainly TUBITAK 1001, 1002 and 1003 projects,) bringing in 1.6 projects per faculty member.

Prof. Dr. Serdar ÖZÇELİK
Head of Department

Publications

1. Hydrogenated derivatives of hexacoordinated metallic Cu2Si monolayer, E. Unsal, F. Iyikanat, **H. Sahin** and R. T. Senger . RSC Advances, 2018, 8, 39976 – 39982
2. Monitoring the effect of asymmetrical vertical strain on Janus single layers of MoSSe via vibrational spectrum, A. Kandemir, F. M. Peeters, **H. Sahin**, The Journal of Chemical Physics 149, 084707 (2018)
3. Ab initio and semiempirical modeling of excitons and trions in monolayer TiS3, E. Torun, **H. Sahin**, A. Chaves, L. Wirtz, and F. M. Peeters, Phys. Rev. B 98, 075419 (2018)
4. Electronic and vibrational properties of PbI2: From bulk to monolayer, M. Yagmurcukardes, F. M. Peeters, and **H. Sahin**, Phys. Rev. B 98, 085431(2018)
5. Synthesis, photophysical and electrochemical properties of novel carbazole-triazine based high triplet energy, solution-processable materials, S Oner, M Aydemir, F Yesil, C Sahin, **C Varlikli**, Dyes and Pigments 159 (2018): 92-99
6. Highly efficient supercapacitor using single-walled carbon nanotube electrodes and ionic liquid incorporated solid gel electrolyte, S Siyahjani, S Oner, PK Singh, **C Varlikli**, High Performance Polymers, 0954008318772333
7. White LED light production using dibromoperylene derivatives in down conversion of energy, E Aksoy, N Demir, **C Varlikli**, Canadian Journal of Physics, 1-6
8. P3HT–graphene bilayer electrode for Schottky junction photodetectors, H Aydın, SB Kalkan, **C Varlikli**, C Çelebi, Nanotechnology 29 (14), 145502
9. Bilayers of Janus WSSe: Monitoring the Stacking Type via Vibrational Spectrum, Ali Kandemir, and **Hasan Sahin**, Phys. Chem. Chem. Phys., DOI: 10.1039/C8CP02802H (2018)
10. Monitoring the Doping and Diffusion Characteristics of Mn Dopants in Cesium Lead Halide Perovskites, T. Guner, B. Akbali, M. Ozcan, G. Topcu, M. M. Demir, and **H. Sahin**, J. Phys. Chem. C, 122 (21), 11543 (2018)
11. Janus single layers of In 2SSe: A first-principles study, A. Kandemir and **H. Sahin**, Phys. Rev. B, 97 155410 (2018)
12. CsPbBr3 perovskites: Theoretical and experimental investigation on water-assisted transition from nanowire formation to degradation, B. Akbali, G. Topcu, T. Guner, M. Ozcan, M. M. Demir, and **H. Sahin**, Phys. Rev. Materials 2, 034601 (2018)
13. Strain mapping in single-layer two-dimensional crystals via Raman activity, M. Yagmurcukardes, C. Bacaksiz, E. Unsal, B. Akbali, R. T. Senger, and **H. Sahin**, Phys. Rev. B, 97 115427 (2018)
14. Polarized emission from CsPbBr3 nanowire embedded-electrospun PU fibers, T. Guner, G. Topcu, U. Savaci, A. Genc, S. Turan, **E. Sari** and M. M. Demir, Nanotechnology 29 13 (2018)
15. Tuning Electronic and Magnetic Properties of Monolayer α-RuCl3 by In-plane Strain, F. Iyikanat, M. Yagmurcukardes, R. T. Senger and **H Sahin**, J. Mater. Chem. C, 6, 2019-2025 (2018)

16. Experimental and Computational Investigation of Graphene/SAMs/n-Si Schottky Diodes, H.Aydin, C.Bacaksiz, N.Yagmurcukardes, C.Karakaya, M.Can, R.T.Senger, **H Sahin** and Y. Selamet, Applied Surface Science, 428, 1010-1017 (2018)
17. Theoretical and Experimental Investigation of Conjugation of 1,6-Hexanedithiol on MoS2, A. Gul, C. Bacaksiz, B. Akbali, E. Unsal, A. Tomak, H. M. Zareie and **H Sahin**, Mater. Res. Express 5 036415 (2018)
18. Graphene-Based Adaptive Thermal Camouflage, O Salihoglu, HB Uzlu, O Yakar, S Aas, O Balci, N Kakenov, **S Balci**, C Kocabas, Nano letters 18 (7), 4541-4548
19. Graphene-Quantum Dot Hybrid Optoelectronics at Visible Wavelengths, O Salihoglu, N Kakenov, O Balci, **S Balci**, C Kocabas, ACS Photonics 5 (6), 2384-2390
20. Electrically switchable metadevices via graphene, O Balci, N Kakenov, E Karademir, **S Balci**, S Cakmakyapan, EO Polat, C Kocabas, Science advances 4 (1), eaao1749
21. Hydrogen-induced sp2-sp3 rehybridization in epitaxial silicone, D. Solonenko, V. Dzhagan, S. Cahangirov, C. Bacaksiz, **Hasan Sahin,** Dietrich R. T. Zahn, and Patrick Vogt, *Phys. Rev. B 96, 235423 (2017)*
22. Stable monolayer alpha-phase of CdTe: strain-dependent properties, Elif Unsal, R. Tugrul Senger and **Hasan Sahin**, *J. Mater. Chem. C, 5, 12249-12255 (2017)*
23. Thinning CsPb2Br5 perovskite down to monolayers: Cs-dependent stability, F. Iyikanat, **E. Sari** and **H. Sahin**, *Physical Review B 96, 155442 (2017)*
24. Hydrogenation-driven phase transition in single-layer TiSe2, F. Iyikanat, A. Kandemir, D. Ozaydin, R. T. Senger and **H. Sahin**, *Nanotechnology, 28 495709 (2017)*
25. Adsorption and diffusion characteristics of lithium on hydrogenated α- and β-silicene, F. Iyikanat, A. Kandemir, C. Bacaksiz and **H. Sahin**, *Beilstein J. Nanotechnol, 8, 1742-1748 (2017)*
26. Few-layer MoS2 as nitrogen protective barrier, BarisAkbali, A. Yanılmaz, A. Tomak, S. Tongay, C. Celebi and **H. Sahin**, *Nanotechnology 28 415706 (2017)*
27. Stable Ultra-thin CdTe Crystal: A Robust Direct Gap Semiconductor, F. Iyikanat, B. Akbali, J. Kang, R. T. Senger, Y. Selamet and **H. Sahin**, *J. Phys.: Condens. Matter 29 485302 (2017)*
28. Stability, electronic and phononic properties of β and 1T structures of SiTex (x=1,2) and their vertical heterostructures, A. Kandemir, F. Iyikanat and **H. Sahin**, *J. Phys.: Condens. Matter 29 395504 (2017)*
29. α-Silicene as Oxidation-resistant Ultra-thin Coating Material, A. Kandemir, F. Iyikanat, C. Bacaksiz and **H. Sahin**, *Beilstein J. Nanotechnol., 8, 1808–1814 (2017)*
30. Hydrogen-Induced Structural Transition In Single Layer ReS2, M.Yagmurcukardes, C. Bacaksiz, R.T. Senger and **H. Sahin**, *IOP 2D Materials 4 035013 (2017)*
31. Triboluminescent electrospun mats with blue-green emission under mechanical force, A. Incel, C. Varlikli, C. D. McMillen, **C. Varlikli** and M. M. Demir, *The Journal of Physical Chemistry C, 121 (21):11709 (2017).*

32. Synthesis, characterization, molecular modeling of novel series of ruthenium (II) complexes with nitrogen/oxygen donor ligands, A. A. Soliman, M. A. Amin, A. A. El-Sherif, C. Sahin and **C. Varlikli,** *Arabian Journal of Chemistry, 10: 389–397 (2017)*
33. Controlling the distribution of oxygen functionalities on graphene oxide and their effects on solution processed blue OLED, H. Diker, G. B. Durmaz, H. Bozkurt, F. Yeşil and **C. Varlikli,** *Current Applied Physics, 17: 565-572 (2017)*
34. h-AlN-Mg(OH)2 van der Waals bilayer heterostructure: Tuning the excitonic characteristics, C. Bacaksiz, A. Dominguez, A. Rubio, R. T. Senger and **H. Sahin,** *Phys. Rev. B 95, 075423 (2017)*
35. Polarization Dependent Vibrational Properties of Quasi-1D Transition Metal TrichalcogenideNanosheets, W. Kong, C. Bacaksiz, B. Chen, K. Wu, M. Blei, X. Fan, Y. Shen , **H. Sahin**, D. P. Wright, D. S. Narang and S. Tongay , *Nanoscale, DOI: 10.1039/C7NR00711F (2017)*
36. Ultra-Thin ZnSe: Anisotropic and Flexible Crystal Structure, C. Bacaksiz, R. T. Senger and **H. Sahin,** *Applied Surface Science, 10.1016/j.apsusc.2017.03.039 (2017)*
37. Fundamental Mechanisms Responsible for the Temperature Coefficient of Resonant Frequency in Microwave Dielectric Ceramics, S. Zhang, **H. Sahin**, E. Torun, F. Peeters, D. Martien, T. DaPron, N. Dilley and N. Newman, *J. Am. Ceram. Soc. 1–9 (2017)*
38. Atomic-scale understanding of dichlorobenzene-assisted poly 3-hexylthiophene-2,5-diyl nanowire formation mechanism, M. Yagmurcukardes, D. Kiymaz, C. Zafer, R. T. Senger and **H. Sahin**, *Journal of Molecular Structure, 1134, 681 (2017)*
39. Observation of mode splitting in photoluminescence of individual plasmonic nanoparticles strongly coupled to molecular excitons, M. Wersall, J. Cuadra, T. J. Antosiewicz, **S. Balci**, and T. Shegai, *Nano Letters*, 17, 551 (2017)
40. Lyotropic liquid-crystalline mesophase of lithium triflate-nonionic surfactant as gel electrolytes for graphene optical modulators, F. M. Balci, **S. Balci**, C. Kocabas, and O. Dag, *J. Phys. Chem C*, 121, 11194 (2017)

Presentations at conferences

1. **H. Sahin**, A seminar during the visit, How manganese changes the color of perovskite", 2018 October 13-20, Department of Physics, University of Antwerp/Belgium.
2. **H. Sahin**, Monitoring the Mn Dopants in Cesium Lead Halide Perovskites, 14th Nanoscience and Nanotechnology Conference, 2018 Sept 22-25, Çeşme, Izmir/Turkey.
3. **H. Sahin**, Water-assisted Transition in CsPbBr3 Perovskite: from Nanowire Formation to Degradation, Graphene Week 2018, 2018 Sept 10-14 San Sebastian/Spain.
4. **C. Varlikli**, Summary of Our Efforts on Imitating Visible Part of Solar Spectrum; Materials Perspective for All Solution Processed WOLEDs, 2nd International Congress on Semiconductor Materials & Devices 2018 (ICSMD2018), 28-30 August 2018 Ardahan/Turkey (O)
5. H. Diker, Ç. Sahin, A. Apostolopoulou, E. Stathatos, **C. Varlikli**, Synthesis and Characterization of Graphene Oxide Derivatives and Their Application in Perovskite Solar Cells, Photovoltaic Conference (PVCon2018), 4-7 July 2018, Ankara/Turkey
6. **H. Sahin**, Ultra-Thin Crystals from Theory to Applications, IZTECH IFG, 2018 June 28-30 Izmir/Turkey.
7. O. Cimen, **C. Varlikli**, Synthesis and Characterization of Polyurethane Acrylate Encapsulation Materials for Organic Photonic Systems, The International Conference on Coatings on Glass and Plastics (ICCG12), 11-15 June, 2018, Würzburg/Germany
8. H. Diker, H. Bozkurt, **C. Varlikli**, Application of PEDOT:PSS-mGO composites as HTL material in a solution processed blue emitting OLED, 1st Light and Light-Based Technologies Workshop, 15 May, 2018, Ankara/Turkey
9. E. Aksoy, T. Güner, M. M. Demir, **C. Varlikli**, Generating White Light Using Perylene Derivatives Doped Fibers, 1st Light and Light-Based Technologies Workshop, 15 May, 2018, Ankara/Turkey
10. **H. Sahin**, Synthetic elemental silicene-like materials Alpha and Beta Silicenes: Hydrogenation and Nanoscale Coating Performance, 2018 Feb 16, Aix Marseilles/France.
11. E. Aksoy, N. Demir, **C. Varlikli**, White Led Light By Using Perylene Derivatives in Downconversion of Energy, 05PP19 Turkish Physical Society 33rd International Physics Congress, September 6-10, 2017, Bodrum /Turkey
12. S. Siyahjani, S. Oner, PK Singh, **C. Varlikli**, Ionic liquid blended gel polymer electrolyte for supercapacitor application, 6th International Conference on Functional Materials and Devices, Melaka, Malaysia, 15-18 August 2017 (O)
13. S. Altuğ, **S. Sevinçli**, Ö. Çakır, Rydberg Atomlarında Atomik Uyarılmanın Difüzyonu, Yoğun Madde Fiziği İzmir Toplantısı, 2017 April 13.

Guest visits

Visits at other institutions

NA

Visitors in Department

Dr. Murat Aytekin from Erzurum Technical University	03.07.2017-21.07.2017
Dr. Ahmed Battal from Muş Alparslan University	23.07.2018-17.08.2018
Dr. Giuseppe Greco from The Institute for Microelectronics and Microsystems/Italy	01.01.2018-25.03.2017
Dr. Berna Akgenç from Kırklareli University	15.06.2018-15.09.2018

Diploma thesis-dissertations

Thesis in preparation

Ahmed Aydın; Development of a Colorimetric bio-assay Method, 2018-

Cansu Hanbaş; Fabrication and Optical Characterization of Graphene/h-BN/Graphene, 2017-

Gülçin Dönmez; Increasing the Photosensitivity of Silicon Carbide Based Ultraviolet Detectors with Graphene Electrode, 2018-

Hakan Bozkurt; Effect of LED Indoor Lighting on the Circadian Rhythms and Sleep-Wake Regulations of Elderly People, 2018-

Hatice İlhan; Investigation of TiO_2:Ternary Quantum Dot Composites Under Simulated and Direct Sun Light for Photocatalytic Applications, 2018-

Mehmet Özcan; Experimental and Theoretical Investigation of Cs-Perovskite Crystals, 2017-

Metin Tan; Plasmonic Enhancements of Perovskite Emitters, 2018-

Ozan Bıyıklı; Manufacturing and Characterization of Perovskite Thin Films Using Novel Methods, 2018-

Ozan Yakar; Graphene Enabled Optoelectronic Devices, 2018-

Sercan Özen; Experimental and Theoretical Investigation of Functionalized Perovskites, 2018-

Şahika Özgüler; Photophysical Characterization of Red, Blue and Green Emitting Quantum Dots and Their Application in QD-LEDs, 2018-

Volkan Bozkuş; Emission Characteristics of Solution Processes Stacked Organic Light Emitting Diodes, 2018-

Yağız Oyun; Three--Photon Electromagnetically Induced Transparency in Rydberg Atoms, 2018-

Yiğit Sözen; Synthesis and Characterization of Graphene-Like Ultrathin Structures, 2018-

Zeynep Kahraman; Adsorption of Molecules on Ultra-Thin Two Dimensional Crystals, 2018-

Thesis completed

NA

Teaching

2016-2017 Spring

Course	Name of Lecturer	Credit/ECTS
PHOT 502 Fundamentals of Photonics I	Emre Sarı	3+0 (3) / 9
PHOT 504 Quantum Photonics I	Sevilay Sevinçli	3+0 (3) / 9
PHOT 505 Applied Photonics	Canan Varlıklı	0+6 (3) / 7
PHOT 508 Mathematical Methods in Photonics	Hasan Şahin	3+0 (3) / 7
PHOT 511 Photophysics	Canan Varlıklı	3+0 (3) / 7

2017-2018 Fall

Course	Name of Lecturer	Credit/ECTS
PHOT 501 Seminar	Sinan Balcı	0+2 (NC) / 7
PHOT 502 Fundamentals of Photonics I	Hasan Şahin	3+0 (3) / 9
PHOT 503 Fundamentals of Photonics II	Emre Sarı	3+0 (3) / 9
PHOT 504 Quantum Photonics I	Sevilay Sevinçli	3+0 (3) / 9
PHOT 505 Applied Photonics	Emre Sarı	0+6 (3) / 7
PHOT 506 Photonic Materials and Devices	Emre Sarı	3+0 (3) / 7
PHOT 510 Ethical Issues in Research Methods	Sevilay Sevinçli	3+0 (3) / 9
PHOT 511 Photophysics	Canan Varlıklı	3+0 (3) / 7
PHOT 517 Organic Light Emitting Devices	Canan Varlıklı	3+0 (3) / 7
PHOT 518 Low-dimensional Materials	Hasan Şahin	3+0 (3) / 7
PHOT 521 Quantum Photonics II	Sevilay Sevinçli	3+0 (3) / 7

2017-2018 Spring

Course	Name of Lecturer	Credit/ECTS
PHOT 502 Fundamentals of Photonics I	Sinan Balcı	3+0 (3) / 9
PHOT 503 Fundamentals of Photonics II	Emre Sarı	3+0 (3) / 9
PHOT 504 Quantum Photonics I	Sevilay Sevinçli	3+0 (3) / 9
PHOT 505 Applied Photonics	Sevilay Sevinçli	0+6 (3) / 7
PHOT 511 Photophysics	Canan Varlıklı	3+0 (3) / 7
PHOT 513 Molecular Electronics and Devices	Canan Varlıklı	3+0 (3) / 7
PHOT 514 Photovoltaics	Ceylan Zafer	3+0 (3) / 7
PHOT 518 Low-dimensional Materials	Hasan Şahin	3+0 (3) / 7

2018-2019 Fall

Course	Name of Lecturer	Credit/ECTS
PHOT 501 Seminar	Sevilay Sevinçli	0+2 (NC) / 7
PHOT 502 Fundamentals of Photonics I	Emre Sarı	3+0 (3) / 9
PHOT 503 Fundamentals of Photonics II	Sinan Balcı	3+0 (3) / 9
PHOT 504 Quantum Photonics I	Sevilay Sevinçli	3+0 (3) / 9
PHOT 505 Applied Photonics	Hasan Şahin	0+6 (3) / 7
PHOT 508 Mathematical Methods in Photonics	Hasan Şahin	3+0 (3) / 7
PHOT 517 Organic Light Emitting Devices	Canan Varlıklı	3+0 (3) / 7
PHOT 531 Biophotonics	Ümit Hakan Yıldız	3+0 (3) / 7

Seminars

Date	Speaker	Title
15.10.2018	Serdar Özçelik	"Brightness-equalized quantum dots" Nature Communications volume 6, Article number: 8210 (2015)
22.10.2018	Sevilay Sevinçli	"Quantum optics in Maxwell's fish eye lens with single atoms and photons" Phys. Rev. A 98, 033803 (2018)
05.11.2018	Canan Varlıklı	"First Example of White Organic Electroluminescence Utilizing Perylene Ester Imides" Chemistry Select Vol. 3, 5123-5129 (2018)
12.11.2018	Hasan Şahin	"Monitoring the Doping and Diffusion Characteristics of Mn Dopants in Cesium Lead Halide Perovskites" J.Phys. Chem. C 122, 21, 11543-11549 (2018)
19.11.2018	Sinan Balcı	"Near-infrared exciton-polaritons in strongly coupled single-walled carbon nanotube microcavities" Nature Communication 7, 13078 (2016)
26.11.2018	Emre Sarı	"Solvent engineering for high-performance inorganic–organic hybrid perovskite solar cells" Nature Mat. 13, 897 (2014)
3.12.2018	Zeynep Kahraman	"Imaging-based molecular barcoding with pixelated dielectric metasurfaces" Science 08 Jun 2018: Vol. 360, Issue 6393, pp. 1105-1109
	Ali Aslan Demir	"Femtosecond laser crosslinking of the cornea for non-invasive vision correction" Nature Photonics volume 12, pages416–422 (2018)
10.11.2018	Volkan Bozkuş	"Optoelectronic crystal of artificial atoms in strain-textured molybdenum disulphide" Nature Communications volume 6, Article number: 7381 (2015)
	Metin Tan	"Alternative Patterning Process for Realization of Large-Area, Full-Color, Active Quantum Dot Display" Nano Lett., 2016, 16 (11), pp 6946–6953
17.11.2018	Cansu Hanbaş	"Fine Structure Constant Defines Visual Transparency of Graphene" Science 320 (5881) 1308
	Şahika Özgüler	"Strain-engineered artificial atom as a broad-spectrum solar energy funnel" Nature Photonics volume 6, pages 866–872 (2012)
24.12.2018	Nahit Polat	"Topological Polaritons" Phys. Rev. X 5, 031001 (2015)
	Ozan Bıyıklı	"Extraordinary optical transmission through sub-wavelength hole arrays" Nature volume 391, pages 667–669 (12 February 1998)

Personnel

Staff

University paid personnel (Full time)

Name-Surname	2017 (Man month)	2018(Man month)
Ahmed AYDIN	-	8
Canan VARLIKLI	12	12
Emre SARI	12	12
Hasan ŞAHİN	12	12
Ozan YAKAR	-	8
Sercan ÖZEN	-	8
Serdar ÖZÇELİK	12	12
Sevilay SEVİNÇLİ	12	12
Sinan BALCI	12	12
Total	**72**	**96**

Externally Funded Personnel

Name-Surname	Source	2017 (Man month)	2018 (Man month)
Ahmed AYDIN	115F616/TÜBİTAK 1003	3	-
Alper YANILMAZ	YÖK 100/2000	5	12
Dilce İNANÇ	YÖK 100/2000	-	11
Halide DİKER	115F616/ TÜBİTAK 1003	1	12
Hazan ÖZKAN	YÖK 100/2000	-	2
Hakan BOZKURT	YÖK 100/2000	-	2
Mehmet ÖZCAN	117F095/ TÜBİTAK 1001	-	8
Nahit POLAT	YÖK 100/2000	-	2
Seçil Sevim ÜNLÜTÜRK	115F616/ TÜBİTAK 1003	-	5
Şahika ÖZGÜLER	115F616/ TÜBİTAK 1003	-	7
Yigit SÖZEN	217M460/ TÜBİTAK 1001	-	2
Zeynep KAHRAMAN	117F095/ TÜBİTAK 1001	-	5
Yağız OYUN	117F372/ TÜBİTAK 1001	-	7
	Total	**9**	**75**

Students

MSc		***PhD***
Ahmed AYDIN	Şahika ÖZGÜLER	Alper YANILMAZ
Cansu HANBAŞ	Volkan BOZKUŞ	Dilce İNANÇ
Gülçin DÖNMEZ	Yigit SÖZEN	Hakan Bozkurt
Hatice İLHAN	Metin TAN	Hazan ÖZKAN
Mehmet ÖZCAN	Ali Aslan DEMIR	Nahit Polat
Ozan BIYIKLI	Zeynep KAHRAMAN	
Ozan YAKAR		
Sercan ÖZEN		
Yağız OYUN		

Funding *(Budget)*

University funding

Ordinary allocation (2017)	5.000 TL
Ordinary allocation (2018)	10.000 TL
Total	15.000 TL

Project funds

Name	Annual/Total Budget	Start-Finish Date
Chemical synthesis of graphene derivatives and their utilization in organic light emitting diodes as anode and hole transport materials/ 114M508-TUBITAK	/239.140 TL	2014-2017
Ultracold Rydberg Atoms in Hexagonal Optical Lattices/ 114C139-TUBITAK	/108.000 TL	2014-2017
Ultrathin Materials for Nanoelectronics and Nanocoating Applications/ 116C073-TUBITAK	/30.000TL	2016-2018
Quantum Dot Manufacturing in Flow Reactor and Fabrication of New Generation Photonic Devices/ 115F616-TUBITAK	866.000 TL/ 1.580.8000 TL	2017-
Optical Properties of Graphene-like Crystals and their Heterostructures/ 117F095-TUBITAK	436.690TL	2017-
Electrically Switchable Two Dimensional Hybrid Optoelectronic Devices/ 117F172-TUBITAK	55.5000 TL	2018-
Three-photon Electromagnetically Induced Transparency/ Absorption (EIT/EIA) with Rydberg Atoms/ 117F372-TUBITAK	199.900TL	2018-
Synthesis of New Acetyl Bridged Perylenediimides as Alternatives to Fullerenes And Investigation of Their Acceptor Features Through Photophysical Processes/ 217Z280-TUBITAK	30.000 TL/ 30.000 TL	2018-