

# Prof. SEZGİN AYDIN

## Personal Information

**Office Phone:** [+90 312 202 1322](tel:+903122021322)

**Email:** [sezginaydin@gazi.edu.tr](mailto:sezginaydin@gazi.edu.tr)

**Other Email:** [sezginaydin@gmail.com](mailto:sezginaydin@gmail.com)

**Web:** <https://avesis.gazi.edu.tr/sezginaydin>

**Address:** Gazi Ünv. Fen Fak. Fizik Bölümü Derslik Binası 3.kat Oda: 3005

## International Researcher IDs

ScholarID: DEZSZRsAAAAJ

ORCID: 0000-0002-5160-3683

Publons / Web Of Science ResearcherID: A-1590-2017

ScopusID: 57191604310

Yoksis Researcher ID: 134458

## Education Information

Doctorate, Gazi University, Fen Bilimleri Enstitüsü, Fizik (Dr), Turkey 2004 - 2010

Postgraduate, Gazi University, Fen Bilimleri Enstitüsü, Fizik (YI) (Tezli), Turkey 2002 - 2004

Undergraduate, Gazi University, Fen Fakültesi, Fizik Bölümü, Turkey 1995 - 2002

## Dissertations

Doctorate, Bor tabanlı kristal yapıların fiziksel özellikleri, Gazi University, Fen Bilimleri Enstitüsü, Fizik (Dr), 2010

Postgraduate, Duffing denklemi, Gazi University, Fen Bilimleri Enstitüsü, Fizik (YI) (Tezli), 2004

## Research Areas

Atomic and Molecular Physics, Theory of Atoms and Molecules, Atomic and Molecular Interactions, Interdisciplinary Physics and Related Science and Technology Areas, Physical Chemistry, Materials Science, Mathematical Methods in Physics, Condensed Matter 1: Structural, Mechanical and Thermal Properties, Intensive Article 2: Electronic Structure, Electric, Magnetic and Optical Properties

## Academic Titles / Tasks

Professor, Gazi University, Fen Fakültesi, Fizik, 2022 - Continues

Associate Professor, Gazi University, Fen Fakültesi, Fizik, 2015 - 2022

Research Assistant, Gazi University, Fen Fakültesi, Fizik, 2006 - 2014

## Courses

GENEL FİZİK II (ELEKTRİK VE MAGNETİZMA), Undergraduate, 2017 - 2018, 2016 - 2017

GENEL FİZİK I (MEKANİK), Undergraduate, 2017 - 2018, 2016 - 2017

## Published journal articles indexed by SCI, SSCI, and AHCI

- I. **Stability of lithium boron carbides with defective chains and a new phase from strain-induced phase transition**  
Kutay K., AYDIN S.  
Computational Materials Science, vol.231, 2024 (SCI-Expanded)
- II. **Mechanical and dynamic properties of stable two-dimensional boron-substituted ThMoB<sub>4</sub>-type graphene: First-Principles Study**  
Aydın S., Çiftçi Y.  
MATERIALS TODAY COMMUNICATIONS, vol.27, 2021 (SCI-Expanded)
- III. **Enhanced hydrogen storage of a functional material: Hf<sub>2</sub>CF<sub>2</sub> MXene with Li decoration**  
Gencer A., Aydın S., Surucu O., Wang X., Deligöz E., Sürücü G.  
APPLIED SURFACE SCIENCE, vol.551, 2021 (SCI-Expanded)
- IV. **211-MAX borides: The stable boron-substituted 211-MAX compounds by first-principles**  
AYDIN S.  
MATERIALS TODAY COMMUNICATIONS, vol.25, 2020 (SCI-Expanded)
- V. **Pressure-induced magnetic phase transitions of intermetallic Fe<sub>2</sub>AlB<sub>2</sub>**  
AYDIN S., Simsek M.  
JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS, vol.502, 2020 (SCI-Expanded)
- VI. **Effect of boron substitution on hydrogen storage in Ca/DCV graphene: A first-principle study**  
Eroglu E., AYDIN S., Simsek M.  
INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, vol.44, no.50, pp.27511-27528, 2019 (SCI-Expanded)
- VII. **The enhancement of hydrogen storage capacity in Li, Na and Mg-decorated BC<sub>3</sub> graphene by CLICH and RICH algorithms**  
AYDIN S., Simsek M.  
INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, vol.44, no.14, pp.7354-7370, 2019 (SCI-Expanded)
- VIII. **Stability and superconductivity properties of metal substituted aluminum diborides (M<sub>0.5</sub>Al<sub>10.5</sub>B<sub>2</sub>)**  
AYDIN S., Simsek M.  
COMPUTATIONAL MATERIALS SCIENCE, vol.154, pp.234-242, 2018 (SCI-Expanded)
- IX. **First-principles hydrogen adsorption properties of Li-decorated ThMoB<sub>4</sub>-type graphene**  
Alp İ., AYDIN S., ÇİFTÇİ Y.  
INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, vol.43, no.33, pp.16117-16127, 2018 (SCI-Expanded)
- X. **Stability and Pressure Dependent Properties of Ternary Lithium Borides of Gold and Silver**  
AYDIN S., Simsek M.  
PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS, vol.255, no.6, 2018 (SCI-Expanded)
- XI. **A superconducting battery material: Lithium gold boride (LiAu<sub>3</sub>B)**  
AYDIN S., Simsek M.  
SOLID STATE COMMUNICATIONS, vol.272, pp.8-11, 2018 (SCI-Expanded)
- XII. **Changing of the structural, electronic and mechanical properties of lithium boron carbide (LiBC) with pressure**  
AYDIN S.  
JOURNAL OF THE FACULTY OF ENGINEERING AND ARCHITECTURE OF GAZI UNIVERSITY, vol.33, no.1, pp.1-12, 2018 (SCI-Expanded)
- XIII. **The structural, mechanical, and electronic properties of LiAlB<sub>4</sub> under pressure from first principles**  
TAYRAN C., AYDIN S.  
PHYSICA STATUS SOLIDI C: CURRENT TOPICS IN SOLID STATE PHYSICS, VOL 14 NO 5, vol.14, no.5, 2017 (SCI-Expanded)
- XIV. **Alkali and Alkaline earth metal doped aluminum tetraborides containing intrinsic planar boron**

**sheet: XAlB<sub>4</sub> (X = Li, Mg, Ca, and Na)**

TAYRAN C., AYDIN S., ÇAKMAK M., Ellialtioglu S.

COMPUTATIONAL MATERIALS SCIENCE, vol.124, pp.130-141, 2016 (SCI-Expanded)

- XV. **The Structural, Elastic, Electronic, Thermodynamic and Vibrational Properties of Protactinium Monocarbide (PaC) from First-Principles Calculations**  
Ciftci Y., Coban C., AYDIN S., Tatar A., Evecen M.  
JOURNAL OF NANOELECTRONICS AND OPTOELECTRONICS, vol.11, no.4, pp.506-513, 2016 (SCI-Expanded)
- XVI. **Effect of pressure on structural, electronic, mechanical and optical properties of ruthenium diboride with oP(12)-type structure**  
AYDIN S., Ciftci Y., Mogulkoc Y., Tatar A.  
INDIAN JOURNAL OF PHYSICS, vol.90, no.7, pp.767-779, 2016 (SCI-Expanded)
- XVII. **Structural and electronic properties of AB- and AA-stacking bilayer-graphene intercalated by Li, Na, Ca, B, Al, Si, Ge, Ag, and Au atoms**  
TAYRAN C., AYDIN S., ÇAKMAK M., Ellialtioglu S.  
SOLID STATE COMMUNICATIONS, vol.231, pp.57-63, 2016 (SCI-Expanded)
- XVIII. **Some new members of MAX family including light-elements: Nanolayered Hf<sub>2</sub>XY (X= Al, Si, P and Y=B, C, N)**  
AYDIN S., Tatar A., ÇİFTÇİ Y.  
SOLID STATE SCIENCES, vol.53, pp.44-55, 2016 (SCI-Expanded)
- XIX. **Site-different structures from dilithium hexaboride (Li<sub>2</sub>)b(6) to dimagnesium hexaboride (Mg<sub>2</sub>B<sub>6</sub>) by first-principles**  
AYDIN S.  
JOURNAL OF ALLOYS AND COMPOUNDS, vol.569, pp.118-125, 2013 (SCI-Expanded)
- XX. **The elastic and mechanical properties of MB<sub>12</sub> (M = Zr, Hf, Y, Lu) as a function of pressure**  
Korozlu N., Colakoglu K., DELİGÖZ E., AYDIN S.  
JOURNAL OF ALLOYS AND COMPOUNDS, vol.546, pp.157-164, 2013 (SCI-Expanded)
- XXI. **First-principles study of hypothetical boron crystals: B-n(n=13, 14, 15)**  
AYDIN S., Simsek M.  
SOLID STATE SCIENCES, vol.14, pp.1636-1642, 2012 (SCI-Expanded)
- XXII. **A theoretical study for thorium monocarbide (ThC)**  
AYDIN S., Tatar A., Ciftci Y.  
JOURNAL OF NUCLEAR MATERIALS, vol.429, pp.55-69, 2012 (SCI-Expanded)
- XXIII. **Pressure-dependent properties of a multifunctional material: Lithium platinum boride (LiPt<sub>3</sub>B)**  
AYDIN S., Simsek M.  
PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS, vol.249, no.9, pp.1744-1755, 2012 (SCI-Expanded)
- XXIV. **Superhard transition metal tetranitrides: XN<sub>4</sub> (X=Re, Os, W)**  
AYDIN S., ÇİFTÇİ Y., Tatar A.  
JOURNAL OF MATERIALS RESEARCH, vol.27, no.13, pp.1705-1715, 2012 (SCI-Expanded)
- XXV. **First-principles study of thiophene on beta-SiC (001)-(2 x 1) surface**  
Simsek M., AYDIN S.  
PHYSICA B-CONDENSED MATTER, vol.406, no.14, pp.2880-2884, 2011 (SCI-Expanded)
- XXVI. **First-principles calculations of elemental crystalline boron phases under high pressure: Orthorhombic B-28 and tetragonal B-48**  
AYDIN S., Simsek M.  
JOURNAL OF ALLOYS AND COMPOUNDS, vol.509, no.17, pp.5219-5229, 2011 (SCI-Expanded)
- XXVII. **The structural, elastic and thermodynamic properties of thorium tetraboride**  
AYDIN S., Tatar A.  
SOLID STATE COMMUNICATIONS, vol.151, no.8, pp.628-633, 2011 (SCI-Expanded)
- XXVIII. **The Mechanical Properties of CaX<sub>6</sub> (X = B and C)**  
AYDIN S., Simsek M.  
NONLINEAR AND COMPLEX DYNAMICS: APPLICATIONS IN PHYSICAL, BIOLOGICAL, AND FINANCIAL SYSTEMS,

pp.127-133, 2011 (SCI-Expanded)

- XXIX. **Thermodynamic properties of UB<sub>6</sub> under high temperature and pressure**  
Tatar A., AYDIN S.  
OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS, vol.4, no.9, pp.1342-1345, 2010 (SCI-Expanded)
- XXX. **The structural, mechanical and electronic properties of LiX<sub>6</sub>(X=C,B): a first principle study**  
Tatar A., AYDIN S.  
OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS, vol.4, no.9, pp.1329-1331, 2010 (SCI-Expanded)
- XXXI. **First-principles calculations of MnB<sub>2</sub>, TcB<sub>2</sub>, and ReB<sub>2</sub> within the ReB<sub>2</sub>-type structure**  
AYDIN S., Simsek M.  
PHYSICAL REVIEW B, vol.80, no.13, 2009 (SCI-Expanded)
- XXXII. **Hypothetically superhard boron carbide structures with a B<sub>11</sub>C icosahedron and three-atom chain**  
AYDIN S., Simsek M.  
PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS, vol.246, no.1, pp.62-70, 2009 (SCI-Expanded)

### Articles Published in Other Journals

- I. **Stability of intrinsic and extrinsic co-decorated boron sheets with Li and Mg**  
Eroglu E., AYDIN S., Simsek M.  
COMPUTATIONAL CONDENSED MATTER, vol.17, 2018 (ESCI)
- II. **First-principles stability investigation of XBC (X=Li, Na, Mg ve Ca) compounds with graphene-like planar boron-carbide layer**  
AYDIN S.  
JOURNAL OF POLYTECHNIC-POLITEKNİK DERGİSİ, vol.18, no.4, pp.197-201, 2015 (ESCI)
- III. **First-Principles Study of Ta<sub>3</sub>B<sub>4</sub>-type TiX<sub>2</sub>B<sub>4</sub> (X=Li, Na, Mg ve Ca) Compounds**  
AYDIN S.  
JOURNAL OF POLYTECHNIC-POLITEKNİK DERGİSİ, vol.18, no.3, pp.133-139, 2015 (ESCI)
- IV. **Spin-Polarized Ground State Properties of Cr<sub>2</sub>AlX (X=C, N and B) Ceramics**  
AYDIN S.  
GAZI UNIVERSITY JOURNAL OF SCIENCE, vol.28, no.2, pp.185-193, 2015 (ESCI)
- V. **The investigation of hardness and bonding behavior in XB<sub>4</sub>, X = {Ce, Th, U, Pa}, tetraborides by first-principles**  
AYDIN S., ÖZCAN A.  
Turkish Journal of Physics, vol.34, no.1, pp.1-12, 2010 (ESCI)
- VI. **The investigation of hardness and bonding behavior inXB<sub>4</sub> X Ce Th U Pa tetraborides by first principles**  
AYDIN S., ÖZCAN A.  
TURKISH JOURNAL OF PHYSICS, 2009 (Scopus)

### Refereed Congress / Symposium Publications in Proceedings

- I. **Üçlü-zincir yapılarına sahip ortorombik lityum bor karbürlerin (o-LiBC) ilk-prensiplerle incelenmesi**  
Öztürk K., Aydın S.  
27. Yoğun Madde Fiziği Ankara, Ankara, Turkey, 16 December 2022, pp.5
- II. **Ag Dekore Edilmiş ThMoB<sub>4</sub> Tipi Grafen Allotropunun Hidrojen Depolama Özelliklerinin İlk İlkeler Yöntemi İle İncelenmesi**  
ALP İ., ÇİFTÇİ Y., AYDIN S.  
22. Yoğun Madde Fiziği Ankara Toplantısı, Ankara, Turkey, 16 December 2016

- III. **Hydrogen adsorption geometries on magnesium decorated planar ThMoB<sub>4</sub> type graphene allotrope: A first principles study**  
ALP İ., AYDIN S., ÇİFTÇİ Y.  
European Advanced Materials Congress 2016, Stockholm, Sweden, 23 - 25 August 2016
- IV. **Hydrogen adsorption on lithium and beryllium decorated planar ThMoB<sub>4</sub> type graphene allotrope**  
ALP İ., AYDIN S., ÇİFTÇİ Y.  
European Advanced Materials Congress 2016, Stockholm, Sweden, 23 - 25 August 2016
- V. **Hydrogen adsorption on Ca decorated hexagonal planar carbon pentaheptite**  
ALP İ., ÇİFTÇİ Y., AYDIN S.  
12th Nanoscience and Nanotechnology Conference, Kocaeli, Turkey, 3 - 05 June 2016
- VI. **Hydrogen storage on nano level optimized pentaheptite graphene allotrope with sodium decoration**  
ALP İ., AYDIN S., ÇİFTÇİ Y.  
12th Nanoscience and Nanotechnology Conference, Kocaeli, Turkey, 3 - 05 June 2016
- VII. **Structural mechanical and electronic properties of XAlB<sub>4</sub> X Li N Ca and Na**  
TAYRAN C., AYDIN S., ÇAKMAK M., ELLİALTIOĞLU S. Ş.  
9th International Physics Conference of the Balkan Physical Union, 24 - 27 August 2015
- VIII. **Structural, Mechanical, and Electronic Properties of XAlB<sub>4</sub> (X=Li, Mg, Ca, and Na)**  
TAYRAN C., AYDIN S., ÇAKMAK M., ELLİALTIOĞLU S. Ş.  
9th International Physics Conference of the Balkan Physical Union (BPU9), Turkey, 24 - 27 August 2015
- IX. **First-Principles Study of Layer-Intercalated Trilayer Graphene**  
TAYRAN C., AYDIN S., ÇAKMAK M., ELLİALTIOĞLU S. Ş.  
11th Nanoscience and Nanotechnology Conference (NanoTR-11), Turkey, 22 - 25 June 2015
- X. **Li-Katkılı Üç-Tabakalı Grafen Sistemlerinin Yapısal ve Elektronik Özellikleri**  
TAYRAN C., AYDIN S., ÇAKMAK M., ELLİALTIOĞLU S. Ş.  
20. Yoğun Madde Fiziği Ankara Toplantısı, Turkey, 26 December 2014
- XI. **The Structural and Electronic Properties of X (Li, Ag, Au)-Intercalated AB Stacking Bilayer-Graphene**  
TAYRAN C., AYDIN S., ÇAKMAK M., ELLİALTIOĞLU S. Ş.  
30th European Conference on Surface Science (ECOSS-30), Turkey, 31 August - 05 September 2014
- XII. **Structural and Electronic Properties of Li-Intercalated AA-Stacking Bilayer-Graphene: A First-Principles Study**  
TAYRAN C., AYDIN S., ÇAKMAK M., ELLİALTIOĞLU S. Ş.  
Turkish Physical Society 31st International Physical Congress, Turkey, 21 - 24 July 2014
- XIII. **X(=Li, Na, Ca, B, Al, Si, Ge, Ag, Au)-Intercalated AA-Stacking Bilayer-Graphene**  
TAYRAN C., AYDIN S., ÇAKMAK M., ELLİALTIOĞLU S. Ş.  
Turkish Physical Society 31st International Physical Congress, Turkey, 21 - 24 July 2014

## Scientific Refereeing

INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, Journal Indexed in SCI-E, July 2021

JOURNAL OF PHYSICS-CONDENSED MATTER, Journal Indexed in SCI-E, July 2021

SUSTAINABLE ENERGY & FUELS, Journal Indexed in SCI-E, July 2021

INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, Journal Indexed in SCI-E, July 2020

COMPUTATIONAL MATERIALS SCIENCE, Journal Indexed in SCI-E, July 2020

## Metrics

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