



Innovasiya və Rəqəmsal  
İnkişaf Agentliyi

**INSTITUTE OF RADIATION PROBLEMS, MINISTRY OF SCIENCE AND  
EDUCATION REPUBLIC OF AZERBAIJAN  
FRANK LABORATORY OF NEUTRON PHYSICS AT THE JOINT INSTITUTE  
FOR NUCLEAR RESEARCH  
CIRRICULUM VITAE and PUBLICATION LIST**

## **Afsun S. Abiyev**

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AGENCY" PUBLIC LEGAL ENTITY. National Nuclear Research  
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Researchgate: <https://www.researchgate.net/profile/Afsun-Abiyev>.

Google Scholar: <https://scholar.google.com/citations?user=fROPCdoAAAAJ&hl=tr>.



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### ***PERSONAL INFORMATION***

<b>Name</b>	<b>Afsun</b>
<b>Surname</b>	<b>Abiyev</b>
<b>Address</b>	Department of Nanotechnology and Radiation Material Science, National Nuclear Research Center of IDDA, Gobu Settlements, Baku-Shamakhi Highway, Baku, AZ-1073, Azerbaijan
<b>e-mails</b>	<a href="mailto:afsunabiyev@gmail.com">afsunabiyev@gmail.com</a>
<b>Date of birth</b>	06.09.1998

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### ***PERSONAL STATEMENT***

In general, my research is to reveal how the various changes in the structure of solids under different radioactive conditions affect the properties of these substances with the help of X-ray and neutron diffraction methods. My research interests revolve around gaining a deeper understanding of the properties of substances crucial for shielding against various types of radiation, including gamma rays, neutrons, electrons, and ion irradiations.

In my capacity as a researcher at the Frank Laboratory of Neutron Physics at the Joint Institute for Nuclear Research, I have garnered extensive expertise in nuclear-related subjects, particularly in the development of shielding materials for nuclear applications. My work involves the investigation of irradiation-

induced damage, the analysis of the impacts of different radiation types, and the exploration of the stability of microstructure, elemental composition, and phase composition under ion radiation.

The primary thrust of my scientific research pertains to the structural and phase state analysis of advanced nano-composite materials designed for nuclear applications. I have conducted experiments employing pure boron compounds and boron-tungsten-based composite materials, subjecting them to alpha particles, neutrons, ions, electrons, and high-energy charged particle flows. My research primarily centers on titanium nitride nanoparticles, which are essential materials due to their high melting points, low vapor pressure, minimal sputtering erosion, and excellent thermal conductivity, rendering them suitable for use as coating materials in plasma-facing components.

Nonetheless, it is important to acknowledge that these materials come with certain limitations, including their performance at low temperatures, compatibility with plasma, resilience to neutron irradiation, and considerations related to radiological safety.

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## ***EDUCATION***

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**09/2022-present**

**Ph.D student**

**Institute of Radiation Problems, AZ1143**

**2225.01-Radiation Materials Science**

**09/2019 – 07/2021**

**Master's degree**

**Baku State University, Baku, AZ1143 Azerbaijan**

**Faculty of physics , 060503-Solid State Electronics, Diplom number- AM 043381**

**09/2015 – 07/2019**

**Bachelor**

**Baku State University, Baku, AZ1143 Azerbaijan**

**Faculty of Physics, 050503-Physics. Diplom number- C 047018**

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## ***EMPLOYMENT HISTORY***

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**01/09/2015 – Present**

**Engineer | Frank Laboratory of Neutron Physics at the Joint Institute for Nuclear Research. Department of Neutron Research and Development in the Field of Condensed Matter: Scientific and Experimental Department of Neutron Research of Condensed Matter.**

**Dubna, Russia**

**01/12/2022 – present**

**"INNOVATION AND DIGITAL DEVELOPMENT AGENCY" PUBLIC LEGAL ENTITY. National Nuclear Research Center of IDDA, Department of Detectors and Radiation Applications.**

**01/09/2020**

**National Nuclear Research Center. Department of Nanotechnology and Radiation Material Science.**

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## ***ADDITIONAL SKILLS / RESEARCH INTEREST***

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I have been working as an engineer at the Frank Laboratory of Neutron Physics at the Joint Institute for Nuclear Research since 2022. During this time, I conducted research using the following analysis methods.

- Real-time neutron diffraction.
- X-ray spectroscopy.

## COMPUTER SKILLS

- Origin Lab (Graphing for Science and Engineering).
- HighScore Plus| XRD Analysis Software.
- FullProf Suite| Suite of Crystallographic Software.
- Diamond Crystal and Molecular Structure Visualization.
- KOMPAS-3D| Computer Aided Design.

## CERTIFICATE

- Baku State University, The Best Student of The Year. 2018.

## Participating projects

- Application Possibilities of Nano-structured ZrC, TLC and VC Thin Films As High Temperature, Radiation and Corrosion Resistant Materials;

## Publications last 2 years

- 2022 Study of thermal properties of  $\text{Cu}_4\text{Se}_{1.5}\text{Te}_{0.5}$  and  $\text{Cu}_4\text{Te}_{1.5}\text{Se}_{0.5}$  compounds by differential thermal analysis. N.A. Aliyeva, Y.I. Aliyev, A.S. Abiyev. Advanced Physical Research. Vol.4, No.2, 2022, pp.94-99
- 2023 Effect of Si and Nb additions on carbonitride coatings under proton irradiation: A comprehensive analysis of structural, mechanical, corrosion, and neutron activation properties. A. Vladescu, M. N. Mirzayev, A. S. Abiyev, A.G. Asadov, E. Demir, K. M. Hasanov, R. S. Isayev, A. S. Doroshkevich, S. H. Jabarov, Sv. Lyubchik, S. Lyubchik, E.P. Popov. Nuclear Materials and Energy. Vol. 35, 101457.
- 2023 Effect of the C/N ratio modification on the corrosion behavior and performance of carbonitride coatings prepared by cathodic arc deposition. M.N. Mirzayev, K.M. Hasanov, A.C. Parau, E. Demir, A.S. Abiyev, Tamer Karaman, S.H. Jabarov, M. Dinu, E.P. Popov, A. Vladescu (Dragomir). Journal of Materials Research and Technology. Volume. 27, pages 1724-1738.
- 2023 Leptothrix biofilms and the formation of oxygen and hydrogen molecules in structure. D. M. Mirzayeva, S. P. Kaplina, M. V. Gustova, I. Z. Kamanina, O. V. Anisimova, A. S. Abiyev, A. G. Asadov, A. S. Doroshkevich, A. Vladescu, S. H. Jabarov, Y. I. Aliyev, R. N. Mehdiyeva, M. N. Mirzayev, L. Slavov, E. Demir, and E. Popov. Modern Physics Letters B. <https://doi.org/10.1142/S0217984923502603>.
- 2023 EFFECTS OF HELIUM ION IRRADIATION ON TUNGSTEN-BASED COMPOSITES: NEUTRON DIFFRACTION; AS A REAL-TIME DIFFRACTOMETER D. Neov, A.I. Beskrovnyi, A.S. Abiyev, D.M. Mirzayeva, E. Demir, A.H. Valizade, T.T. Hlatshwayo, T.T. Thabethe, O.A. Samedov, R.N.Mehdiyeva, K. Hasanov, Z.A. Sharipov, A.S. Doroskevich, F. Mamedov. Advanced Physical Research. Vol.5, No.2, 2023, pp.95-10.
- 2023 Calculation of defect formation energy of point defects in  $\text{CdGa}_2\text{Se}_4$ . G. B. Ibragimov, A. Sh. Mustafabeyli, and A. S. Abiyev. International Journal of Modern Physics B, <https://doi.org/10.1142/S0217979224501352>.

- 2023 Defect formation energy for various charge states of point defects in CdGa<sub>2</sub>S<sub>4</sub>.  
G. Ibragimov, A. Mustafabeyli & A. Abiyev. Indian Journal of Physics volume 97,  
pages 3495–3500.
- 2023 INFRARED LUMINESCENCE OF GeS: Nd LAYERED CRYSTALS. S.G.  
Asadullayeva , A.O. Dashdemirov , A.S. Alekperov , N.A. Ismayilova, A.A. Hadieva,  
A.N. Cafarova, A.S. Abiyev. Advanced Physical Research Vol.5, No.1, 2023, pp.12-18  
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