



## Nikola Novaković

**Nationality:** Serbian **Date of birth:** 20/12/1971 **Gender:** Male

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**Work:** Mike Petrovića Alasa 12-14, 11001 Belgrade (Serbia)

### ABOUT ME

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Nikola Novaković was born on December 20th, 1971 in Belgrade. He graduated from the Faculty of Physics, University of Belgrade in 2000. He earned his Masters degree in physics in 2003. He defended his Ph.D. thesis in physics in 2010, titled „Ab initio study of properties of alkali, earth alkali, and transition metals hydrides“. Since 2000 he has been employed in the Laboratory for Nuclear and plasma physics at VINČA Institute of nuclear sciences. Since 2005 he is a member of the Local structures and clusters group in the same Laboratory. His graduation work was connected with nuclear physics methods application in solid state physics and material science, his initial research field was the investigation of chemical environment and order using the method of time-resolved perturbed angular gamma-gamma correlations. Besides primary experimental activities, he moved towards complementary research of electronic structures and local environment in intermetallics and semiconducting doped systems, and later in metal hydrides and hydrides in general, using numerical methods based on density functional theory (DFT) and experimental spectroscopy X-rays absorption methods – EXAFS, XANES, and XMCD.

His current areas of scientific interest are theoretical modelling of microproperties of materials with prospect use in energetics and experimental and theoretical investigation of local structures of semiconducting and ceramic materials with prospect use in thermo and optoelectronics.

He is the deputy director of the Laboratory for nuclear and plasma physics, head of the Laboratory for theoretical modeling of materials in the CONVINCE Center of Excellence, and the member of Governing board of the VINČA Institute of nuclear sciences

### EDUCATION AND TRAINING

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#### PhD in Physics

*University of Belgrade, Faculty of Physics, 2010*

City: Belgrade

Country: Serbia

### WORK EXPERIENCE

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#### Full research professor

*VINČA Institute of nuclear sciences*

City: Belgrade

Country: Serbia

- DFT based numerical computations
- material science - metal hydrides
- X ray absorption spectroscopy
- hydrogen storage utilisation - tanks, compressors,...

### MANAGEMENT AND LEADERSHIP SKILLS

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#### Management of international projects

**International project: SOPHIA – European Research Infrastructure Project – „Metal Doped Rutile TiO<sub>2</sub> as electrode in DSSC“, (2014)**

**International project: HPC EUROPA2** – „Investigation of TiO<sub>2</sub> surface and MgH<sub>2</sub>-TiO<sub>2</sub> interface hydrogen dynamics“, (2012)

**International project: I-20110117 EC DESY – HASYLAB, Hamburg, Germany** – „Investigation of mechanism of formation and bonding features of local structures in highly doped metal oxides“, (2011)

### **Management of national projects**

Innovation fund of the republic of Serbia, Technology transfer call, project number 1146:

"Design of solid state hydrogen tank for application in stable stationary power supply", 2023

Innovation fund of the republic of Serbia, Proof of Concept call, project number 5437:

"Design of solid state hydrogen tank for application in stable stationary power supply", 2020

National project of the Ministry of Education, Science, and Technological Development, III455012, "Synthesis, processing, and characterization of nanostructured materials for application in energetics, ecology, engineering and biomedicine" - project task management "Theoretical research of hydrogen storage materials"

### **MEMBERSHIP IN THE PROGRAM COMMITTEES OF CONFERENCES**

**2018, Member of programme and organizing board of 3<sup>rd</sup> International Symposium on Materials for Energy Storage and Conversion**

**2018, Member of Scientific board** of EMRS-2018 Spring Meeting - Symposium B "Theoretical searches for innovative materials for energy harvesting and storage"

**2012, Member of programme and organizing board:** „Joint meeting of 11<sup>th</sup> Conference of Young Researchers in Field of Material Science and the 1<sup>st</sup> European Early Stage Researchers Conference of Hydrogen Storage“, 03-05. 12. 2012, Belgrade, Serbia

**2011, Member of organizing board:** „The 1<sup>st</sup> Conference of the Serbian Ceramic Society“, 17-18. 03.2011, Belgrade, Serbia

**2010, Member of organising and technical board:** „The 4<sup>th</sup> Serbian Congress on Microscopy“, Belgrade, Serbia 11-12. October 2010.

### **PHD and MSc thesis mentorship**

#### **Co-mentor of PhD thesis of Sandra Kurko,**

theme: Theoretical and experimental study of changes induced in MgH<sub>2</sub> matrix by B and N ion irradiation, Faculty of Physical Chemistry, Belgrade University, 2015

#### **Mentor of M.Sc thesis of Igor Milovanović.**

Theme: Theoretical study of surface effects on hydrogen desorption kinetics of MgH<sub>2</sub> finished in 2011, Faculty of Physical Chemistry, Belgrade University

#### **Mentor of PhD thesis of Radojka Vujasin**

THEORETICAL AND EXPERIMENTAL STUDY OF TiO<sub>2</sub> INFLUENCE ON HYDROGEN SORPTION IN MgH<sub>2</sub>/Mg SYSTEM, Faculty of Physical Chemistry, Belgrade University, 2017

Mentor of PhD thesis of Bojana Paskaš Mamula, theme: Electronic structure and topological analysis of charge density topology of metal-hydride systems with NaCl and rutile crystal structure, Faculty of Physics, Belgrade University, 2017  
theme: Theoretical and experimental study of changes induced in MgH<sub>2</sub> matrix by B and N ion irradiation, Faculty of Physical Chemistry, Belgrade University, 2015

#### **Mentor of M.Sc thesis of Igor Milovanović.**

Theme: Theoretical study of surface effects on hydrogen desorption kinetics of MgH<sub>2</sub> finished in 2011, Faculty of Physical Chemistry, Belgrade University

·Mentor of PhD thesis of Radojka Vujasin, THEORETICAL AND EXPERIMENTAL STUDY OF TiO<sub>2</sub> INFLUENCE ON HYDROGEN SORPTION IN MgH<sub>2</sub>/Mg SYSTEM, Faculty of Physical Chemistry, Belgrade University, 2017

Mentor of PhD thesis of Bojana Paskaš Mamula, theme:Electronic structure and topological analysis of charge density topology of metal-hydride systems with NaCl and rutile crystal structure, Faculty of Physics, Belgrade University, 2017

## **SOCIAL AND POLITICAL ACTIVITIES**

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### **Head of NGO "Hydrogen Initiative of Serbia"**

[Jasenova 10, 11001 Belgrade Serbia ]

Non profit organisation "Hydrogen Initiative of Serbia" was founded in 2016 with the goal of promoting and reising public awareness regarding pros and cons of emerging zero carbon future based on hydrogen economy.

## **PUBLICATIONS**

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### **Journals (last 10 publications)**

1. Yang, F., Wang, J., Zhang, Y., Wu, Z., Zhang, Z., Zhao, F., Huot, J., Grobivć Novaković, J., & **Novaković, N.** (2022). **Recent progress on the development of high entropy alloys (HEAs) for solid hydrogen storage: A review.** International Journal of Hydrogen Energy, 47(21), 11236–11249. <https://doi.org/10.1016/j.ijhydene.2022.01.141>

2. Sandra Kurko, Bojana Paskaš Mamula, Jelena Rmuš, Jasmina Grbović Novaković, **NikolaNovaković**

### **DFT study of boron doped MgH<sub>2</sub>: Bonding mechanism, hydrogen diffusion and desorption**

International Journal of Hydrogen Energy, DOI:<https://doi.org/10.1016/j.ijhydene.2019.05.015>

3.J. Grbović Novaković, **N. Novaković**, S. Kurko, S. Milošević Govedarović, T. Pantić, B. Paskaš Mamula, K. Batalović, J. Radaković, J. Rmuš, M. Shelyapina, N. Skryabina, P. de Rango and D. Fruchart

### **Influence of defects on Mg-based hydrides stability and hydrogen sorption behavior**

ChemPhysChem, DOI: 10.1002/cphc.201801125R2

4.I.Radisavljević, **N.Novaković**, H.E.Mahnke, V.Andrić, S.Kurko, D.Milivojević, N.Romčević, N.Ivanović

### **Survey of electronic properties and local structures around Fe in selected multinary chalcogenides**

Journal of Alloys and Compounds, Volume 782, 25 April 2019, Pages 160-169

5.Bojana Paskaš Mamula, Bojana Kuzmanović, Mirjana Medić Ilić, Nenad Ivanović, **Nikola Novaković**

### **Bonding mechanism of some simple ionic systems: Bader topological analysis of some alkali halides and hydrides revisited**

Physica B, Volume 545, 15 September 2018, Pages 146-151

6.Radojka Vujasin, Jasmina Grbovic Novakovic, **Nikola Novakovic**, Simone Giuseponi, Massimo Celino

### **Ab-initio study of hydrogen mobility in the vicinity of MgH<sub>2</sub>-Mg interface: the role of Ti and TiO<sub>2</sub>**

Journal of Alloys and Compounds, doi: 10.1016/j.jallcom.2016.11.250

7.Željka Rašković Lovre, Sandra Kurko, Nenad Ivanović, JoseFrancisco Fernandez, Jose- Ramon Ares, Sašo Šturm, Trygve Mongstad, **Nikola Novaković**, Jasmina D. Grbovic Novakovic

### **In situ Desorption of Magnesium Hydride Irradiated and Non-irradiated Thin**

## Films: Relation to Optical Properties

Journal of Alloys and Compounds, Volume 695, 25 February 2017, Pages 2381-2388

8.I. Radisavljević, B. Kuzmanović, **N. Novaković**, H.-E. Mahnke, L. Vuličević, S. Kurko, N. Ivanović

### Structural stability and local electronic properties of some EC synthesized magnetite nanopowders

Journal of Alloys and Compounds, Volume 697, 15 March 2017, Pages 409-416

9.R. Vujasin, A. Mraković, S. Kurko, **N. Novaković**, Lj. Matović, J. Grbović Novaković, Sanja Milošević

### Catalytic activity of titania polymorphs towards desorption reaction of $MgH_2$ , International Journal of Hydrogen Energy, Volume 41, Issue 8, 41(8) 2016, Pages 4703-4711

10.Sanja Milošević, Sandra Kurko, Luca Pasquini, Ljiljana Matović, Radojka Vujasin, **Nikola Novaković**, Jasmina Grbović Novaković

### Fast hydrogen sorption from $MgH_2-VO_2(B)$ composite materials

Journal of Power Sources Volume 307, 1 March 2016, Pages 481-488

## LANGUAGE SKILLS

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Mother tongue(s): **Serbian**

Other language(s):

### English

### Russian

LISTENING C2 READING C2 WRITING C2

LISTENING B2 READING C2 WRITING B2

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2 SPOKEN PRODUCTION A1 SPOKEN INTERACTION A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

## DIGITAL SKILLS

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programming C, C++, .NET, HTML, Python, Scilab, Matlab, Javascript, / Vector and bitmap software - Corel, Adobe Photoshop, GIMP