Oxide materials for optoelectronics

Invited lecturers: J. Paul Attfield, Sergey Medvedev, C. Richard A. Catlow, Alfonso Munoz, Nirupam Chakraborti, Miroslav Dramicanin, Chong-Geng Ma

LECTURES OF THE SPRING SEMESTER 2023 in the frame of project STER 2023:

ORGANIZERS: Prof. Wojciech Paszkowicz (Institute of Physics PAS), Prof. Andrzej Suchocki (Institute of Physics PAS), Dr. Roman Minikayev (Institute of Physics PAS)

The series of lectures entitled "Oxide materials for optoelectronics" is devoted to studies of oxide materials. The lectures include the synthesis and properties of oxides, as well as experimental and theoretical methods of studies useful in the science of oxides. In particular, the lectures will cover the synthesis under pressure, optical properties variation with pressure, modeling of the crystal structure and defects and electronic structure. Lectures on the evolutionary optimization and modeling methods, optical thermometry as well as on modelling of phosphors will be presented. The program of lectures is intended for both beginner scientists dealing with the subject of oxides and for PhD students. Some of the lectures cover experimental and theoretical methods of general (not only in the field of oxides) application. We encourage interested listeners to participate in discussions after lectures and to contact lecturers directly.

Cykl wykładów zatytułowany "Materiały tlenkowe dla optoelektroniki" poświęcony jest badaniom materiałów tlenkowych. Wykłady obejmują syntezę i właściwości tlenków oraz eksperymentalne i teoretyczne metody badań przydatne w nauce o tlenkach. W szczególności wykłady będą dotyczyć syntezy pod ciśnieniem, zmian właściwości optycznych pod wpływem ciśnienia, modelowania struktury kryształu i defektów oraz struktury elektronowej. Przedstawione zostaną wykłady z optymalizacji metodami ewolucyjnymi i z metod modelowania, termometrii optycznej oraz modelowania luminoforów. Program wykładów przeznaczony jest zarówno dla początkujących naukowców zajmujących się tematyką tlenków, jak i dla doktorantów. Część wykładów dotyczy eksperymentalnych i teoretycznych metod ogólnego (nie tylko dla materiałów tlenkowych) zastosowania. Zainteresowanych słuchaczy zachęcamy do udziału w dyskusjach po wykładach oraz do bezpośredniego kontaktu z wykładowcami.

Schedule

No	*date*	*lecturer*	*lecture titles*
1.1	Mon 8 May 2023, 10:30-11:15 +discussion	Prof. J. Paul Attfield (UK)	High pressure synthesis of new oxides and nitrides. Overview of extreme conditions science and HP synthesis methods (LVP etc.)
1.2	Wed 10 May 2023, 13:30-1415 +discussion	Prof. J. Paul Attfield (UK)	High pressure synthesis of new oxides and nitrides. Examples of new high-pressure electronic and magnetic materials
1.3	Thu 11 May 2023, 13:00-13:45 +discussion	Prof. J. Paul Attfield (UK)	High pressure synthesis of new oxides and nitrides. Examples of new high-pressure electronic and magnetic materials (suite)
2.1	cancelled		
3.1	Wed 17 May 2023, 12:00-12:45 +discussion	Prof. C. Richard A. Catlow (UK)	Modelling of bulk and surface structures of oxides
2.2	cancelled		
2.3	cancelled		
4.1.	Mon 22 May 2023, 10:30-11:15 +discussion	Prof. Alfonso Munoz (Spain)	*Ab-initio* simulations in high pressure condensed matter, fundamentals and applications (part 1)
4.2	Wed 24 May 2023,	Prof. Alfonso Munoz	*Ab-initio* simulations in high pressure condensed

	12:00-12:45 +discussion	(Spain)	matter, fundamentals and applications (part 2)
4.3	Fri 26 May 2023, 12:00-12:45 +discussion	Prof. Alfonso Munoz (Spain)	*Ab-initio* simulations in high pressure condensed matter, fundamentals and applications (part 3)
3.2	Thu 1 June 2023, 12:00-12:45 +discussion	Prof. C. Richard A. Catlow (UK)	Modelling of electronic properties of oxides
6.1	Mon 12 June 2023, 10:30-11:15 +discussion	Prof. Miroslav Dramicanin (Serbia)	Optical thermometry with lanthanide and transition metal activated oxide materials (part 1)
3.3	Mon 12 June 2023, 12:00-12:45 +discussion	Prof. C. Richard A. Catlow (UK)	Modelling of defect properties of oxides Lecture on line
5.1	Mon, 12 June 2023, 14:00-14:45 +discussion	Prof. Nirupam Chakraborti (Czech Republic)	Evolutionary optimization /modeling methods and their applications in materials (including oxides) design (part 1)
6.2	Tue 13 June 2023, 12:00-12:45 +discussion	Prof. Miroslav Dramicanin (Serbia)	Optical thermometry with lanthanide and transition metal activated oxide materials (part 2)
5.2	Tue 13 June 2023, 13:00-13:45 +discussion	Prof. Nirupam Chakraborti (Czech Republic)	Evolutionary optimization /modeling methods and their applications in materials (including oxides) design (part 2)
6.3	Wed 14 June 2023, 12:00-12:45 +discussion	Prof. Miroslav Dramicanin (Serbia)	Optical thermometry with lanthanide and transition metal activated oxide materials (part 3)
5.3	Wed 14 June 2023, 13:00-13:45 +discussion	Prof. Nirupam Chakraborti (Czech Republic)	Evolutionary optimization /modeling methods and their applications in materials (including oxides) design (part 3)
7.1	**Tue, 12 Sept. 2023, 12:00-12:45 +discussion**	**Prof. Chong-Geng Ma (PR China)**	**How to make "good" phosphors *via* first-principles modelling (part 1)**
7.2	**Wed, 13 Sept. 2023, 12.00-12:45 +discussion**	**Prof. Chong-Geng Ma (PR China)**	**How to make "good" phosphors *via* first-principles modelling (part 2)**
7.3	**Fri, 15 Sept.2023, 12:00-12:45 +discussion**	**Prof. Chong-Geng Ma (PR China)**	**How to make "good" phosphors *via* first-principles modelling (part 3)**

The lectures by Prof. Chong-Geng Ma will be held in room 203 of the Institute of Physics, PAS