1. Materials for electrochemical power sources

The field of research of electrochemical power sources is currently one of the most active in the scientific sense, due to the foreseen limited supplies of fossil fuels and the needs of a modern society in terms of mobility and flexibility of the power source. The section will focus on the development of electrode materials for electrochemical energy sources, primarily batteries and electrochemical capacitors. In this regard, this section will primarily deal with experimental and theoretical studies of oxide materials and carbon materials used as active electrode materials in batteries and electrochemical capacitors, as well as in hybrid systems. The focus will be onstudies dealing with synthesis, characterization and analysis of energy storage mechanisms in these electrochemical systems. Of particular interest are studies dealing with new materials of reduced dimensionality in terms of physical and chemical properties, and from the aspect of the mechanism of energy storage.

2. Catalysis, electrocatalysis and photocatalysis in energy conversion and storage

Heterogeneous catalytic processes, electrocatalytic and photocatalytic processes currently occupy a very important place in the energy conversion and storage, especially in combination with electrochemical power sources. This section will focus on materials that are used in catalytic, electrocatalytic and photocatalytic processes with the emphasis on catalytic and electrocatalytic processes in fuel cells (hydrogen fuel cells, direct alcoholic fuel cells, direct borohydride fuel cells, and other types), hydrogen production materials and electrochemical production of other gases (new materials for water electrolysis, chlorine production), (electro)catalysts for the reduction of CO_2 to ethanol, materials for photocatalytic water splitting. Of special interest are studies dealing with the synthesis and characterization of materials, analyzing the mechanisms of catalytic processes, modeling the catalyst and new catalytic systems.

3. Application of ion conductors in energy conversion and storage

Ionic conductors are of great importance in modern processes of energy conversion and storage. This section will primarily deal with experimental and theoretical research in the field of the development of new ionian conductors for applications in fuel cells, low and high temperature systems. Important for this section are studies dealing with innovative approach in the synthesis of ionic conductors, analysis of mechanisms of implementation and modification of ion-conductive properties.

4. Application of polymeric materials in the energy conversion and storage

Polymer materials have found application in many modern technologies, as well as in the field of energy conversion and storage. Considering the scope of modern research in this field, a special section will deal with polymeric materials, although they are employed in the systems mentioned in Sections 1 and 2. Of particular interest for this section is the application of conductive polymeric materials in electrochemical systems for energy conversion and storage, batteries and electrochemical capacitors, application of composite materials based on conductive polymers in catalysis, electrocatalysis and

photocatalysis. Studies that correlate the conditions of synthesis, physical and chemical properties and performances of polymeric materials and their composites in the energy conversion and storage are of great importance.

5. Hydrogen energy and hydrogen storage materials

The concept of hydrogen energy is one of the most important in connection with attempts to solve the (upcoming) energy crisis. While materials science provides new strategies for the production of hydrogen, its efficient storage and transport are also crucial for the future development of hydrogen energy. This section will deal with the design, synthesis and characterization of hydrogen storage materials. Experimental and theoretical studies, as well as combinations of experimental-theoretical study, are of interest.

6. Solar energy materials

The aim of this session is to address recent developments in the field of solar energy materials. Strategies and mechanisms of improvement of materials performance, with regard to solar irradiation, thermal emission, atmospheric absorption, visible light, and photosynthetic efficiency are of special importance. We welcome experimental and theoretical papers as well as combined studies on solar energy materials.

7. The future of materials science in the field of energy conversion and storage

The aim of this section is the synthesis of the previous results from the field of materials science with application in energy conversion and storage and analysis of possible directions in the development of the field. Presentations within this section will be held by researchers with decades of experience in research and development of the field. The section will be specially organized by the Scientific Committee of the Meeting with a number of invited lecturers.

8. First Steps in Materials Science - Student‘s Pitch presentation section

The student section is intended for the undergraduate and master students who within this section will have the opportunity to present their research in the field of materials science for energy conversion and storage, carried out in summer practice, professional development, etc.. Alternatively, students will be able to present a research idea with the concretization of the research plan. Short presentations of 3 minutes are planned with additional 3 minutes for discussion.