

Závěrečná zpráva o řešení projektu za rok 2011- 2012

Programový projekt AKTION

AKTION Česká republika - Rakousko

Dům zahraničních služeb, Na Poříčí 1035/4, 110 00 Praha 1, Tel. +420 221 850 506, 602 169 216, web: www.dzs.cz , e-mail: aktion@dzs.cz

Partnerská země: Rakousko	
Číslo projektu: 61p5	
<i>Název projektu: 4. bilaterální česko-rakouský odborný seminář: Nové trendy v aplikaci foto a elektro katalýzy</i> <i>Project title: 4th bilateral Czech-Austrian scientific workshop: New trends in photo and electro catalysis</i>	
Řešitel projektu v ČR: Prof. Dr. Ing. Josef Krýsa	Řešitel v partnerské zemi: Assoc. Prof. Dr. Guenter Fafilek
Dosažené výsledky – plnění cílů projektu: The 4 th Czech - Austrian workshop „New trends in application of photo and electro photocatalysis“ was a successful continuation of the conference series organized jointly by Institute of Chemical Technology, Prague, University of Vienna and Vienna University of Technology. Before the start of the workshop the chairman of the conference (Josef Krýsa) visited the partner institution in Austria. The purpose of the stay was the finalization of the Workshop program and preparation of the first circular and the template of Proceedings contributions. Circular and the template were then send to all the participants. The workshop was held three days from 5 th to 7 th December 2011 and there were 38 participants. The topic was focused more to the recent advances of photoelectrocatalysis and electrochemistry in respect to their application in environment cleaning. The workshop was attended by new undergraduate and PhD students enrolled at ICT Prague and ICP AS CR in 2010. It is possible to say that the 4 th workshop represented all positive aspects of a small specialised international conference. Participants were from four Czech institutions : Institute of Chemical Technology, Prague, Jaroslav Heyrovsky Institute of Physical Chemistry, Academy of Sciences of the Czech Republic, Institute of Chemical Process Fundamentals, Academy of Sciences of the Czech Republic, Faculty of Chemical Technology, Technical University Brno; and from four Austrian institutions : University of Vienna, Vienna University of Technology, Austrian Institute of Technology GmbH Tulln and Johannes Kepler University Linz. Beside this there were participants from other European countries: France (CNRS Mendon-Bellevue), Slovenia (University of Nova Gorica), Slovakia (Slovak University of Technology in Bratislava), Germany (Friedrich-Alexander University, Erlangen), and United Kingdom (Queens University, Belfast).	

The objective of the workshop was to further intensify the exchange of experience and new ideas in the field of semiconductor photocatalysis, EPR spectroscopy, dye sensitised solar cells, electrochemically prepared self organised structures, corrosion, fuel cells, electrochemical engineering and modelling of electrochemical processes. Workshop was especially useful for students, for most of them it was one of the first opportunities to present their results at the international forum. All contributions were well accepted and appreciated, and the discussions among the participants were found beneficial. We were able to keep the positive trend: increasing the number of international institutions, in fact three more countries (in comparison with the 3rd workshop held in 2009) participated (Slovakia, Germany and UK). Currently we look forward to the 5th workshop which is planned to be held in November 2012.

In the project application it was planned to publish the Proceedings of the 4th Czech-Austrian workshop. Because the workshop was held in December, Proceedings was planned to be printed in 2012. First of all received 2-4 page contributions of presenting authors were edited from scientific point of view. Some manuscripts were returned to authors for revisions. Then the language of all the manuscripts has been checked. Editors of Proceedings were: Prof. Dr. Ing. Josef Krýsa and Doc. Dr. Ing. Petr Klusoň. The final scientific correction of the proceedings was done jointly by Proceedings editor (Josef Krýsa) and by Austrian partner (Guenter Fafilek) during the stay of Josef Krýsa at TU Wien). Finally Proceedings were printed in June 2012 (ISBN 978-80-7080-809-2) and distributed to all participants)

<p>V Praze dne: 30.6.2012</p>	<p>Jméno a podpis řešitele projektu:</p>  <p>Prof. Dr. Ing. Josef Krýsa Telefon: 220444112 (4009)</p>	<p>Jméno a podpis statutárního zástupce organizace:</p> <p>Telefon:</p>
---	---	---

Anex I. Content of the Workshop proceedings

Anex I. Content of the Workshop proceedings

CONTENT


List of authors	6
List of participants	7
Programme of the workshop	8
Dye sensitised solar cells: New challenges from graphene cathode and iodine-free electrolyte	11
Solution-derived photocatalytic coatings for organics removal from water	14
Thin sol-gel TiO ₂ films prepared by inkjet printing – Synthesis and characterization	19
Thin sol-gel TiO ₂ films prepared by inkjet printing – Photoelectrochemical properties	24
Effect of preparation parameters on the properties of sprayed TiO ₂ layers	29
Modification of TiO ₂ electronic properties by means of chemical treatment (doping)	34
Planar electrochemical cells for photocatalysis	37
Photocatalysis on TiO ₂ in Alkaline Solutions	41
Photocatalytic activity of facade paints containing commercial ZnO and TiO ₂ photocatalysts	45
Application of epr spectroscopy in the investigation of titania photocatalysts	49
Continuous flow cell for online epr measurement of oxygen radicals on photocatalytic layers	53
Photoinduced generation of reactive oxygen species in titanium dioxide suspensions (an EPR study)	58
Approaches for MRSA decontamination in pigs environment	61
Comparison of two evaluation methods of yeast photo-killing on TiO ₂	65
Determination of antibacterial properties of photocatalytic coatings	69
Surface dielectric barrier discharge with ZnO photocatalyst for ozone production	74
Treatment of polluted air using photocatalytic processes	79
Influence of the gas diffusion layer material and method of catalyst deposition on performance of anode for the PEM water electrolysis	84
Novel ceramic materials for polymer electrolyte membrane water electrolyzers' anodes	89
Alkaline water electrolysis with Nafion membrane	92
Comparison of the novel homogeneous and heterogeneous anion-selective membranes for alkaline water electrolysis	98
Two-dimensional dynamic mathematical model of catalytic layer degradation in PEM type fuel cell	107
Kinetics of cathodic reactions on processed titanium surfaces	112
Raman spectroscopy of electrochemical induced blackening of Yttrium Stabilised Zirconia	116
Electrochemical and spectroelectrochemical study of nanocrystalline TiO ₂ anatase with exposed (001) faces	120

Využití poskytnuté dotace - přehled čerpaných finančních částek v roce 2012 :**

1. travel expenses 3742,25 Kč
- cost of car transport of the Proceedings editor to the partner institution (TU Wien) and back, charged at ICT Prague. The purpose of the stay at TU Wien was the joint scientific corrections of contributions in the Proceedings and preparation of Proceedings for press

2. Publication of the workshop proceedings
– 60 pcs. 6257,75. Kč

Total sum: 10000,- Kč

V Praze dne: 30.6.2012	Jméno a podpis řešitele projektu:  Prof. Dr. Ing. Josef Krýsa Telefon: 220444112 (4009)	Jméno a podpis statutárního zástupce organizace: Telefon:
---	---	--

** Účetní doklady jsou uloženy v organizaci řešitele.

Anex II. Statement of account