

<b>Program</b>	Program CEEEX MATNANTECH - Modul I Contract: 68/2006
<b>Project title (ENG):</b>	<b>Preparation, characterization and application of nanostructured materials at direct and /or photo-assisted electrochemical degradation of pollutants</b>
Project title (RO):	<b>Contribuții privind obținerea, caracterizarea și utilizarea unor materiale nanostructurate, la degradarea electrochimică directă și/sau fotoasistată a unor poluanți.</b>
<b>Duration</b>	2006-2008
<b>Team Leader as part of INCD ECOIND</b>	Senior Researcher Monica Ilios, Chim .Eng.
<b>Summary</b> (short description) ENG	<p>INCD-ECOIND, as a partner within this project, was assigned the task for preparing, characterising and testing of some modified oxide structures to be used for electro-oxidative degradation processes of pollutants such as phenols and azo dyes.</p> <p>Electrocatalytically modified films on SnO<sub>2</sub> anodes: Ti/RuO<sub>2</sub>/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>-RuO<sub>2</sub> and Ti/RuO<sub>2</sub>/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>-Bi<sub>2</sub>O<sub>3</sub> were characterized with respect to their structure (by using infrared spectrometry and scanning electron microscopy) and electrochemical properties (cyclic voltammetry). The influence of operating parameters on the degradation process at the modified oxide nanostructures was studied for azo dyes and ethoxylated nonyl phenols. The degradation process was assessed by using UV-VIS spectroscopy.</p> <p>The removal yields of the colour ranged from 92 to 99% for Reactive Blue 4, Reactive Black 5 and Reactive Red 147 by using the modified films on SnO<sub>2</sub> anodes and the following working conditions: pHs of 6.2, 11 and 13, electrolysis duration of 120 min and dye initial concentration of 100 mg/L.</p> <p>At 300 A/m<sup>2</sup> and 120 min electrolysis duration, Ti/RuO<sub>2</sub>/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>-RuO<sub>2</sub> anode and an initial pollutant concentration of 100 mg/L, the residual concentrations were 26.52 mg/L for NF16 and 35.23 mg/L for NF40. By working under the same working conditions, at Ti/RuO<sub>2</sub>/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>-Bi<sub>2</sub>O<sub>3</sub>, the residual concentrations of NF16 and NF40 were lower than 10 mg/L.</p>
<b>Summary</b> (short description) RO	<p>INCD-ECOIND, partener in cadrul acestui proiect, a avut ca sarcina obtinerea caracterizarea si testarea unor structuri oxidice modificate pentru procese de degradare electro-oxidativa a unor poluanti (fenoli, coloranti azoici).</p> <p>Peliculele electrocatalitice ale anozilor SnO<sub>2</sub> modificati: Ti/RuO<sub>2</sub>/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>-RuO<sub>2</sub> si Ti/RuO<sub>2</sub>/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>-Bi<sub>2</sub>O<sub>3</sub>, au fost caracterizate din punct de vedere structural (prin spectrometrie de infraroșu si microscopie cu scanare de electroni) si al proprietatilor electrochimice (prin voltametria ciclică). A fost stabilita influenta parametrilor de operare a instalatiei versatile de testare asupra procesului de degradare electrochimica a poluantilor de tipul colorantilor azoici și a nonilfenolilor etoxilati pe nanostructurile oxidice modificate Procesul de degradare a fost evaluat cu ajutorul spectrometriei de absorbtie in UV-Vis.</p> <p>S-au atins valori ale gradului de indepartare a culorii cuprinse intre 92 si 99% pentru Albastru Reaktiv 4, Negru Reactiv 5 si Rosu Reactiv 147 prin degradarea electro-oxidativa pe anozii de SnO<sub>2</sub> modificati in urmatoarele conditii de lucru: pH de 6,2; 11 și 3, densitate de curent de 100 A/m<sup>2</sup>, timp de electroliza de 120 minute si concentratie initiala de colorant de 100 mg/L.</p> <p>La 300 A/m<sup>2</sup> și 120 minute de electroliză în cazul Ti/RuO<sub>2</sub>/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>-RuO<sub>2</sub> si o concentratie initiala de 100 mg/L poluant, pentru</p>

	NF16 s-a ajuns la o concentratie reziduala de 26,52 mg/L, iar pentru NF40 35,23 mg/L. In aceleasi conditii de operare, pe Ti/RuO <sub>2</sub> /SnO <sub>2</sub> -Sb <sub>2</sub> O <sub>5</sub> -Bi <sub>2</sub> O <sub>3</sub> concentratiile reziduale de NF16 și NF40 s-au situat sub 10 mg/L.
<b>Dissemination of results</b>	
Full-paper ISI	<b>Ihos, M.</b> , Manea, F., Bocea, G., Jitaru, M., Le comportement électrochimique des anodes en SnO <sub>2</sub> modifiées en presence des polluants phenoliques, <i>Revue Roumaine de Chimie</i> , <b>2009</b> , 54(4), 301-307, ISSN : 0035-3930, WOS:000270468100007
Full-paper BDI	<b>Ihoș, M.</b> , Bocea, G., Manea, F., Electrochemical degradation of nonylphenol poliethoxylate at Ti/RuO <sub>2</sub> /SnO <sub>2</sub> -Sb <sub>2</sub> O <sub>5</sub> anodes, <i>Chemical Bulletin of „Politehnica” University of Timisoara</i> , <b>2007</b> , 52(66), 1 - 2, 47 – 50, ISSN: 1224-6018
	<b>Ihos, M.</b> , Manea, F., Iovi, A., Removal of nonylphenol polyethoxylate by electrochemical oxidation at modified SnO <sub>2</sub> electrodes, <i>Chemical Bulletin of „Politehnica” University of Timisoara</i> , <b>2008</b> , 53(67), 1 - 2, 175-178, ISSN: 1224-6018
Conferences (platform, poster, abstract / full-paper	<b>Ihos, M.</b> , Bocea, G., Manea, F., Jitaru, R., Le comportement electrochimique des anodes en SnO <sub>2</sub> modifiées, en presence des pollutants phenoliques, <i>Journees d'electrochimie</i> , 2-6 July <b>2007</b> , Lyon, France, Book of Abstracts, 238 poster and abstract
	<b>Ihos, M.</b> , Bocea, G., Andres, L., Manea, F., Utilization of SnO <sub>2</sub> anodes to the electrochemical degradation of biorefractory dyes, <i>the 14<sup>th</sup> Symposium on Analytical and Environmental Problems</i> , 24 September <b>2007</b> , Szeged, Hungary, Book of Proceedings, 212-215, ISBN: 978-963-87720-0-8 poster and full-paper
	Manea, M., Radovan, C., Proca, C., Bebeselea, A., Burtica, G., Cinghita, D., <b>Ihos, M.</b> , The availability of boron-doped diamond electrode for anodic determination of nonylphenols etoxylates, <i>the 6<sup>th</sup> Spring Meeting of the International Society of Electrochemistry</i> , 16-19 March, <b>2008</b> , Foz do Iguacu, Brazil, Book of Abstracts, 154 poster and abstract
	<b>Ihos, M.</b> , Manea, F., Iovi, A., Degradation of recalcitrant organic compounds by electrochemical method, <i>the 15<sup>th</sup> Symposium on Analytical and Environmental Problems</i> , 22 September <b>2008</b> , Szeged, Hungary, Book of Proceedings, 317-321, ISBN: 978-963-482-903-4 platform and full-paper