

Program	Program CEEC MATNANTECH - Modul I Contract: 68/2006
Project Leader Institution (CO)	Universitatea "Babes-Bolyai" Cluj-Napoca
Project title (ENG):	Preparation, characterization and application of nanostructured materials at direct and /or photo-assisted electrochemical degradation of pollutants
Project title (RO):	Contribuții privind obținerea, caracterizarea și utilizarea unor materiale nanostructurate, la degradarea electrochimică directă și/sau fotoasistată a unor poluanți.
Duration	2006-2008
Team Leader as part of INCD ECOIND, Partner 3	Senior Researcher Monica Ihos, Chim .Eng.
Summary (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 SnO₂ anodes: Ti/RuO₂/SnO₂-Sb₂O₅-RuO₂ and Ti/RuO₂/SnO₂-Sb₂O₅-Bi₂O₃ 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 SnO₂ 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/m² and 120 min electrolysis duration, Ti/RuO₂/SnO₂-Sb₂O₅-RuO₂ 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/RuO₂/SnO₂-Sb₂O₅-Bi₂O₃, the residual concentrations of NF16 and NF40 were lower than 10 mg/L.</p>
Summary (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 SnO₂ modificati: Ti/RuO₂/SnO₂-Sb₂O₅-RuO₂ si Ti/RuO₂/SnO₂-Sb₂O₅-Bi₂O₃, 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 SnO₂ modificati in urmatoarele conditii de lucru: pH de 6,2; 11 și 3, densitate de curent de 100 A/m², timp de electroliza de 120 minute si concentratie initiala de colorant de 100 mg/L.</p>

	La 300 A/m ² și 120 minute de electroliză în cazul Ti/RuO ₂ /SnO ₂ -Sb ₂ O ₅ -RuO ₂ și o concentrație inițială de 100 mg/L poluant, pentru NF16 s-a ajuns la o concentrație reziduală de 26,52 mg/L, iar pentru NF40 35,23 mg/L. În aceleași condiții de operare, pe Ti/RuO ₂ /SnO ₂ -Sb ₂ O ₅ -Bi ₂ O ₃ concentrațiile reziduale de NF16 și NF40 s-au situat sub 10 mg/L.
Dissemination of results	
Full-paper ISI	Ihos, M. , Manea, F., Bocea, G., Jitaru, M., Le comportement électrochimique des anodes en SnO ₂ modifiées en présence des polluants phénoliques, <i>Revue Roumaine de Chimie</i> , 2009 , 54(4), 301-307, ISSN : 0035-3930, WOS:000270468100007
Full-paper BDI	Ihoș, M. , Bocea, G., Manea, F., Electrochemical degradation of nonylphenol polyethoxylate at Ti/RuO ₂ /SnO ₂ -Sb ₂ O ₅ anodes, <i>Chemical Bulletin of „Politehnica” University of Timisoara</i> , 2007 , 52(66), 1 - 2, 47 – 50, ISSN: 1224-6018
	Ihos, M. , Manea, F., Iovi, A., Removal of nonylphenol polyethoxylate by electrochemical oxidation at modified SnO ₂ electrodes, <i>Chemical Bulletin of „Politehnica” University of Timisoara</i> , 2008 , 53(67), 1 - 2, 175-178, ISSN: 1224-6018
Conferences (platform, poster, abstract / full-paper)	Ihos, M. , Bocea, G., Manea, F., Jitaru, R., Le comportement électrochimique des anodes en SnO ₂ modifiées, en présence des polluants phénoliques, <i>Journées d'électrochimie</i> , 2-6 July 2007 , Lyon, France, Book of Abstracts, 238 poster and abstract
	Ihos, M. , Bocea, G., Andres, L., Manea, F., Utilization of SnO ₂ anodes to the electrochemical degradation of biorefractory dyes, <i>the 14th Symposium on Analytical and Environmental Problems</i> , 24 September 2007 , 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., Ihos, M. , The availability of boron-doped diamond electrode for anodic determination of nonylphenols ethoxylates, <i>the 6th Spring Meeting of the International Society of Electrochemistry</i> , 16-19 March, 2008 , Foz do Iguacu, Brazil, Book of Abstracts, 154 poster and abstract
	Ihos, M. , Manea, F., Iovi, A., Degradation of recalcitrant organic compounds by electrochemical method, <i>the 15th Symposium on Analytical and Environmental Problems</i> , 22 September 2008 , Szeged, Hungary, Book of Proceedings, 317-321, ISBN: 978-963-482-903-4 platform and full-paper