Program	**CEEX MENER, Contract : 642/2005**
Project title (ENG):	**The application of nanostructured materials into AOPs processes for advanced oxidation of priority pollutants from wastewater, FOTOX**
Project title (RO):	**Utilizarea matrialelor nanostructurate pentru procedee tip AOPs in vederea oxidarii avansate a pluantilor prioritari din ape uzate, FOTOX**
Duration	2005-2008
Team Leader	Eng. Nitoi Ines
Summary (short description) ENG	The general target of the project was to elaborate an advanced degradation technology for prior compounds specified in GD 351/2005 as chlorinated aromatic compounds (maximum accepted concentration level of μg/l), by heterogeneous photocatalysis based on solar light as UV source and photocatalysts like TiO_2 nanostructurated materials. Project results were concretized by the followings: -Documentary study regarding the AOPs applied processes in the field of advanced degradation of priority pollutants like aromatic chlorinated compounds and influence factors of photodegradation processes. -Setting the pollution level with aromatic chlorinated compounds and pollution context of some wastewater sources. -Study of sol-gel method applied in order to synthesize macromolecular lattice of metallic oxide and the influence factors of the process. -Setting the kinetic equations and photodegradation mechanisms of Chlorobenzene via direct photolysis, homogeneous and heterogeneous catalyzes and evaluation the influence of operating parameters on rate constants and process efficiency. -Assessment of pollutant structure influence and wastewater pollution context upon photodegradation efficiency. -Obtaining of photocatalyst as nanometric sol-gel powder based on S doped TiO_2 having the followings characteristics: presence of TiO_2 in a single crystalline phase - anatase, crystalline degree = 98%, crystallite dimension = 147 Å. -Setting treatment technology of wastewater with chlorobenzene content (mg/l content), and establishing of optimal operating parameter able to assure a high pollutant removal degree according with stipulated in force limit (≤ μg/l); the proposed technology tested on solar photocatalytic pilot installation, consists of: *pre-treatment by neutralization-settling* (optional applied for removal of suspended matters > 60 mg/l and/or iron > 0.5 mg/l), *heterogeneous photocatalysis* (pH = 7, S -TiO_2 dose = hundreds mg/l, reaction time / mg CB removed ≤ tens min), *photocatalyst separation and recirculation*
Summary (short description) RO	Proiectul isi propune elaborarea unei tehnologii de degradare avansata a compusilor prioritari nominalizati prin HG 351/2005, de tipul derivatilor aromatici clorurati (concentratie maxima admisa de ordinul μg/l), prin fotooxidare catalitica bazata pe utilizarea de fotocatalizatori constituiti din materiale nanostructrate realizati din TiO_2 si a luminii solare ca sursa de iradiere. Principalele rezultate obtinute au fost urmatoarele: -Studiul documentar privind procedeele tip AOPs aplicate in degradarea avansata a compusilor prioritari, de tipul derivatilor aromatici clorurati si factori de influenta ai proceselor de fotodegradare. -Stabilirea nivelului de poluare cu derivati organici clorurati si a matricilor de impurificare a unor surse de ape reziduale. -Studiul metodei sol-gel aplicata pentru obtinere de retele macromoleculare de oxid metalic cu evidentierea factorilor de influenta ai procesului. -Stabilirea ecuatiilor cinetice si mecanismelor de fotodegradare clorbenzen prin fotoliza directa, fotocataliza omogena, fotocataliza heterogena si evaluarea

	influentei parametrilor de operare asupra constantelor de viteza si eficientei procesului. -Evaluarea influentei structurii poluantului si contextului de impurificare al apelor reziduale asupra eficientei fotodegradarii acestuia. -Obtinere fotocatalizator tip pulberi sol-gel nanometrice pe baza de TiO_2 dopat cu S, cu urmatoarele caracteristici: prezenta TiO_2 intr-o singura faza cristalina – anatas, grad cristalinitate = 98%, dimensiune crsitalit = 147 Å. -Definitivarea tehnologiei de tratare a apelor uzate cu continut de clorbenzen de ordinul mg/l si stabilirea parametrilor optimi de operare, care asigura indepartarea avansata a poluantului la nivelul limitelor impuse de legislatia in vigoare (≤ µg/l); tehnologia propusa, testata pe instalatie pilot fotocatalitica solara, consta in: *pretratare prin neutralizare-decantare* (se aplica optional pentru indepartarea materiilor in suspensie in concentratii > 60 mg/L si/sau fierului in concentratii > 0,5 mg/L); *fotocataliza heterogena* (pH = 7, S - TiO_2doza = sute mg/L, timp reactie/mg CB indepartat ≤ zeci min); *separare si recirculare fotocatalizator*).
Dissemination of results	
PhD Thesis – Title	Chlorobenzene degradation by photolysis, UV/H_2O_2 assisted photolysis and UV/TiO_2 photocatalysis. Elaboration of a solar reactor for wastewater treatment, Ines Nitoi, 2011
Full-paper ISI	M.,Crisan, A., Braileanu, M., Raileanu, M., Zaharescu, D., Crisan, N., Dragan, M., Anastasescu, A., Ianculescu, **I., Nitoi**, V.E., Marinescu, Sol-gel S-doped TiO2 materials for environmental protection, Journal of Non-crystalline Solids, Vol. 354, No.2-9, pp. 705-711,2008.
	T., Oncescu, **I., Nitoi**, P., Oancea, Chlorobenzene degradation assisted by TiO_2 under UV irradiation in aqueous solutions, Journal of Advanced Oxidation Technologies, Vol. 11, No. 1, pp 105-110, 2008
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	M., Raileanu, M., Crisan, N., Dragan, D., Crisan, A., Galtayries, A., Braileanu, A., Ianculescu , V.S., Teodorescu, **I., Nitoi**, M., Anastasescu, Sol-gel doped TiO_2 nanomaterials: a comparative study, Journal of Sol-gel Science and Technology , Vol. 51, No.3, pp. 315-329, 2009
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	M., Raileanu, M., Crisan, N., Dragan, D., Crisan, A., Galtayries, A., Braileanu, A., Ianculescu , V.S., Teodorescu, **I., Nitoi**, M., Anastasescu, Sol-gel doped TiO_2 nanomaterials: a comparative study, 5th International Conference on Sol-Gel Materials, Research, Technology and Applications, Trzebieszowice, Polonia, 01-05.06. 2008

Conferences (platform, poster, abstract / full-paper)	M., Crisan, M., Raileanu, A., Braileanu,D., Crisan, N., Dragan, **I., Nitoi**, A., Ianculescu, Sol-gel pure and S-doped TiO_2 with ecological applications,4th Balkan Conference on glass science and tehnology & 16th Conference on glass and ceramics, 27.09.-01.10. 2011, Varna, Bulgaria
Patents	M.,Crisan, M.,Raileanu, D., Crisan, N., Dragan, **I., Nitoi**, A.,Ianculescu, M., Anastasescu, V., Marinescu, A process for producing a titanium dioxide photocatalyst in the form of film or powder and thus obtained photocatalysts, Patent no. RO125151-B1/26.02.2016