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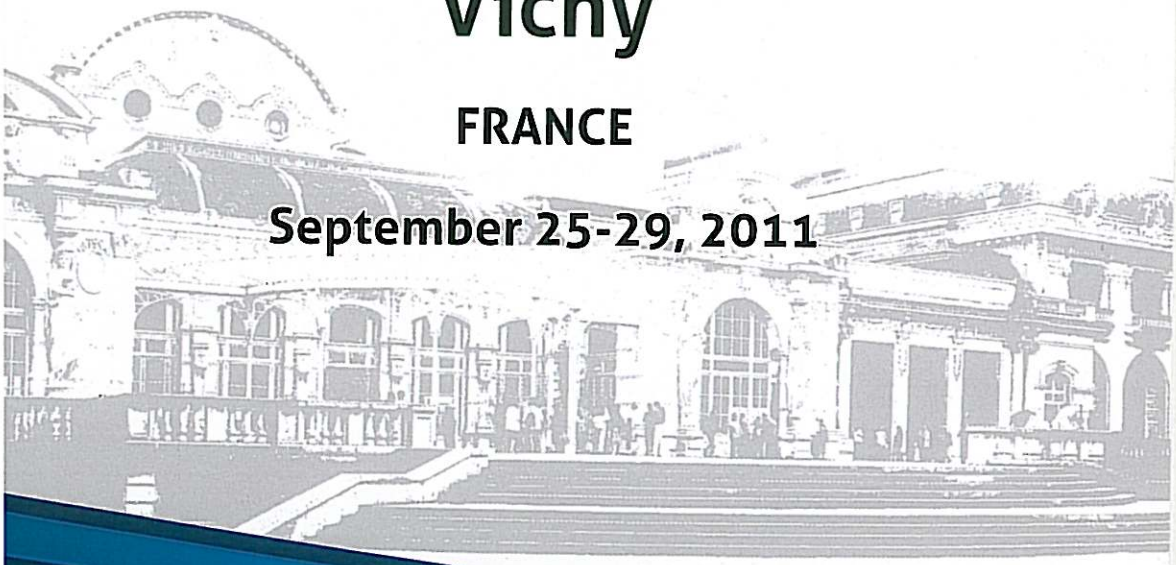

Book of Abstracts

ACTIVATED CARBONS TREATED WITH SULPHURIC ACID FOR DEGRADATION OF TRINITROPHENOL BY CATALYTIC WET AIR OXIDATION

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Trinitrophenol (TNP) is a by-product of the industrial synthesis of nitrobenzene. The resulting waste is liquid at the processing temperature (above 348 K) and solid when left at ambient temperature. As a consequence, taking advantage of the high temperature at which it is released, catalytic wet air oxidation (CWAO) is a suitable option to treat this effluent. A recent work shows that metal-free carbon materials can be used as catalysts for degradation of TNP by CWAO at 473 K[1]. In this work, metal-free activated carbons commonly used for wastewater treatment (Norit ROX 0.8, original – AC, or chemically modified with sulphuric acid – ACX-Y, where X represents sulfuric acid concentration (in M) and Y treatment temperature (in K)), were studied as catalysts for CWAO at 448 K. Since green solutions based in cost-effective processes are preferable whenever possible, integrating low temperature CWAO with other post-treatment advanced oxidation process could provide a favorable way out. The results show that the removal of TNP increases considerably when the carbon materials are used as CWAO catalysts (Fig. 1a). In particular, treated activated carbons are more efficient than the original AC. Additional experiments indicate that a photocatalytic post-treatment can be used to achieve total degradation of TNP (Fig. 1b).

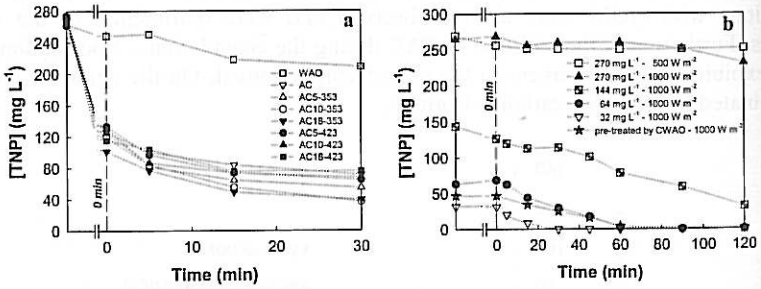

Fig. 1: Evolution of trinitrophenol concentration (a) in non-catalytic and catalytic WAO experiments using the original and treated activated carbons (448 K, 0.7 MPa oxygen pressure, 1.3 g L^{-1} catalyst loading); (b) in photocatalytic experiments with 1 g L^{-1} of TiO_2-P25 at various initial TNP concentrations and irradiance values.

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