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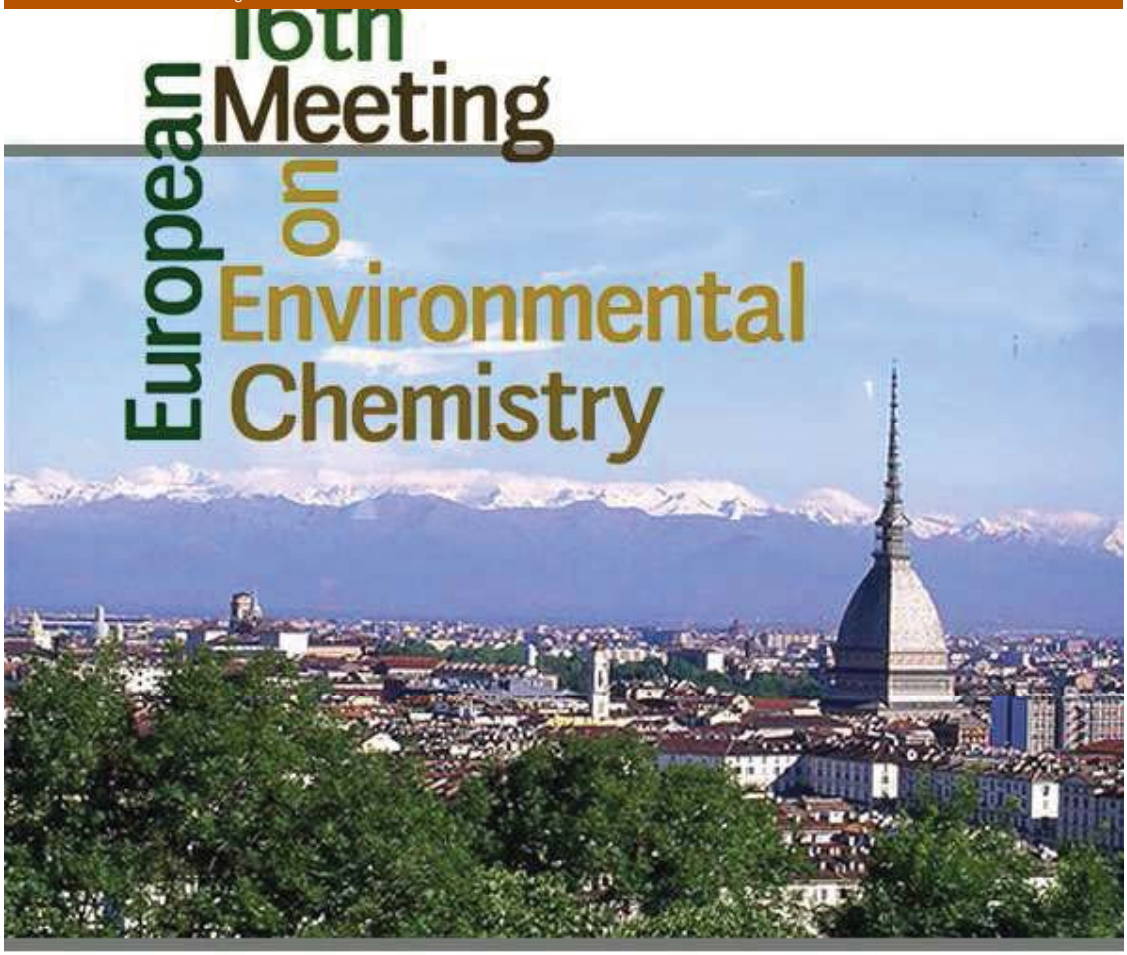
TORINO, ITALY

BOOK OF ABSTRACTS



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Pd-based catalysts for hydrodechlorination of Aroclor 1260

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PCBs are known recalcitrant and toxic pollutants and significant amount of contamination could be found in water. It is known that PCBs can be hydrodechlorinated using Pd-based catalysts, but due to technical challenges catalytic hydrogenation has only been limitedly applied at the field-scale [1,2]. Therefore the research to identify more efficient catalysts, preferably heterogeneous catalysts, able to work in an aqueous phase, less sensible to deactivation and easily removable at the end of the treatment, remains a considerable interesting goal. Different Pd-based catalysts, many of which prepared by us with innovative methodologies, were tested in the hydrodechlorination reaction of the Aroclor 1260 PCBs mixture with hydrogen under hydroalcoholic conditions (H_2O/ EtOH 2/1). The degree of PCBs dechlorination was found to be dependent by the nature of Pd-based catalyst and of base used to neutralize the produced HCl. Working with a substrate/catalyst 8/1 molar ratio, at 3 MPa H_2 and 60°C in 20 h a significant removal of highly chlorinated PCBs (n° Cl atoms ≥ 6) was obtained. Some results, obtained by GC-MS analysis, are reported in the Table and seem promising for remediation of groundwater contaminated with PCBs.

	STD aroclor 1260	Run 1	Run 2
n° Cl	%	%	%
0	0.02	3.37	1.97
1	0.05	2.04	1.07
2	0.24	8.41	4.41
3	0.50	15.40	8.83
4	0.59	14.42	11.40
5	10.65	20.18	21.61
6	46.69	21.22	29.29
7	33.57	12.24	17.65
8	6.86	2.48	3.42
9	0.78	0.23	0.34
10	0.05	0.01	0.01

Table

References:

[1] Ben-Zen Wu, Hsiang-Yu Chen, Shaofen J Wang, Chien M. Wai, Weisheng Liao, KongHwa Chiu, Chemosphere 88 (2012) 757–768

[2] Brian P. Chaplin, Martin Reinhard, William F. Schneider, Christoph Schüth, John R. Shapley, Timothy J. Strathmann, Charles J. Werth, Environ. Sci. Technol. 46 (2012) 3655−3670