Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Non-thermal plasma synthesis of H_2O_2: investigation of DBD and surface-DBD performances FREDERIC THEVENET, Université Lille-Nord-de-France F-59000, Lille, France, JULIEN COUBLE, IRCELYON - UMR 5256 CNRS Université Lyon1, 69100 Villeurbanne - France, MARKUS BRANDHORST, JEAN-LUC DUBOIS, Arkema - CRRA, 69310 Pierre-Bénite, DANIEL BIANCHI, IRCELYON - UMR 5256 CNRS Université Lyon1, 69100 Villeurbanne - France — Authors focused on H_2O_2 non-thermal plasma synthesis. A H_2/ O_2 mixture is used as reactant gas flow. If the reaction is performed into a simple glass discharge tube selectivities regarding H_2O and H_2O_2 are respectively 98.5 and 1.5%. In order to improve performances, materials were associated to the discharge. This aimed at using material surface properties to drive recombination of dissociated species toward targeted products. Four materials were tested: SiO_2 coating, TiO_2 coating, SiO_2 fibres, TiO_2 fibres. Regardless to their chemical nature, coatings do not induce any improvement. On the contrary, fibres multiplied by 20 the selectivity toward H_2O_2. The yield of H_2O_2 is multiplied by 35 with SiO_2 fibres and by 50 with TiO_2 fibres. Investigations have been performed in order to understand the interaction between the discharge and inorganic fibres. Authors propose a reaction scheme in order to summarize gaseous and adsorbed reactions.

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Date submitted: 07 Jun 2010 Electronic form version 1.4