

Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

The effect of microwave and pulse corona discharges on hydrocarbons partial oxidation, combustion and detonation initiation ALEXANDER BABARITSKII, MAXIM DEMINSKY, VIKTOR JIVOTOV, DMITRII MEDVEDEV, SERGEY KOROBTSSEV, ROMAN SMIRNOV, GRIGORY KONVALOV, MIKHAIL KROTOV, MARINA STRELKOVA, BORIS POTAPKIN, RRC “Kurchatov Institute” — We present experimental and theoretical results on application of microwave plasmas for stimulation of partial oxidation processes for hydrogen rich gas production from gas and liquid hydrocarbons. Said results ranging from investigation of plasma catalysis mechanism, kinetics and energy balance to plasma reactor design and heat management issues. It is appeared that relatively small plasma energy deposition (0.1eV per outcome H₂, or CO molecule) under certain range of plasma parameters leads to the significant acceleration of partial oxidation processes and this effect can be used for compact on board plasma reformer development. The paper includes test results of 10 st.m³/h plasma reformer. Experimental and theoretical results devoted to MW plasma and pulse corona discharge application for combustion and detonation initiation are discussed as well.

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Date submitted: 14 Aug 2006

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