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## Fuel Composition Analysis of Endothermically Heated JP-8 Fuel for use in a Pulse Detonation Engine

By Air Force Institute of Technology (U. S. ). Graduate School of Engineering and Management

Biblioscholar Sep 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x8 mm. This item is printed on demand - Print on Demand Neuware - Waste heat from a pulse detonation engine (PDE) was extracted via zeolite catalyst coated concentric tube-counter flow heat exchangers to produce supercritical pyrolytic conditions for JP-8 fuel. A sampling system and method were developed that enabled samples of reacted fuel to be extracted during steady state operation. Samples were taken over a range of heat exchanger exit temperatures from 820 K (1016 oF) to 940 K (1232 oF). Offline analysis of liquid and vapor fuel samples indicated fuel decomposition via typical pyrolytic reaction pathways. The liquid analysis showed conversion of parent fuel components with formation of unsaturates (aromatics and alkenes) and smaller alkanes. The gaseous products consisted of predominantly C1-C3 alkanes and alkenes (gt; 75% of total vapor yield) with moderate amounts of hydrogen and C4-C6 alkanes and alkenes. The components that were present in the stressed fuel samples were more detonable and could be linked to improved PDE performance. The ignition time decreased by over 20% as temperature increased from 820 K (1016 oF) to 935 K (1224 oF) and by more than 30% when compared to...



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