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ADVANCES IN FLUORESCENCE EVALUATION OF THERMAL STABILITY

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Thermal Stability is a characteristic that related to the fuel's ability to resist the formation of deposits when passed over a heated surface. The adverse effects of poor thermal stability are formation of deposits, which deteriorates fuel system hardware in an aircraft engine. This paper aims to address the capabilities of LASER-Induced Fluorescence (LIF) as a tool to access the thermal stability of Jet fuel.

In the 1990s Southwest Research Institute (SwRI) developed LIF as a viable technique to measure the relative concentration and rate of formation of precursor molecules that lead to the formation of deposits in a fuel nozzle in a thermally stressed Jet fuel. Recently, SwRI demonstrated the potential relationship between JFTOT break-point temperature and relative precursor concentration measured by the LIF technique as a result of heating.

The current work involves measurement of relative precursor concentration and rate of precursor production for nineteen different Jet fuels with break-point temperatures ranging from 225-315 C. The work will investigate and present the dependence of fluorescence intensity, effect of work on the fuel on Breakpoint temperature. The ultimate objective of this research is to investigate the extent to which the LIF technique can assess the thermal stability of Jet fuels.