Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Does thermal explosion really get delayed by natural convection? MOHAMED AL-ASEERI, Department of Chemical Engineering, College of Engineering, University of Bahrain, Bahrain, WEIDONG GUO, LEWIS JOHNS , RANGA NARAYANAN, Department of Chemical Engineering, University of Florida, Gainesville — A thermal explosion is said to occur in a region if heat generated steadily therein cannot be conducted to its boundaries. Our interest is in the effect of natural convection on the conditions for thermal explosion. It is surprising, first, that adding a second mechanism for heat loss lowers the steady rate of heat generation and, second, that natural convection, therefore appears to do little to change the point of explosion. This is due to the fact that the flow, by lowering the heat generation, is self-weakening.

Ranga Narayanan
Department of Chemical Engineering, University of Florida,Gainesville

Date submitted: 03 Aug 2007 Electronic form version 1.4