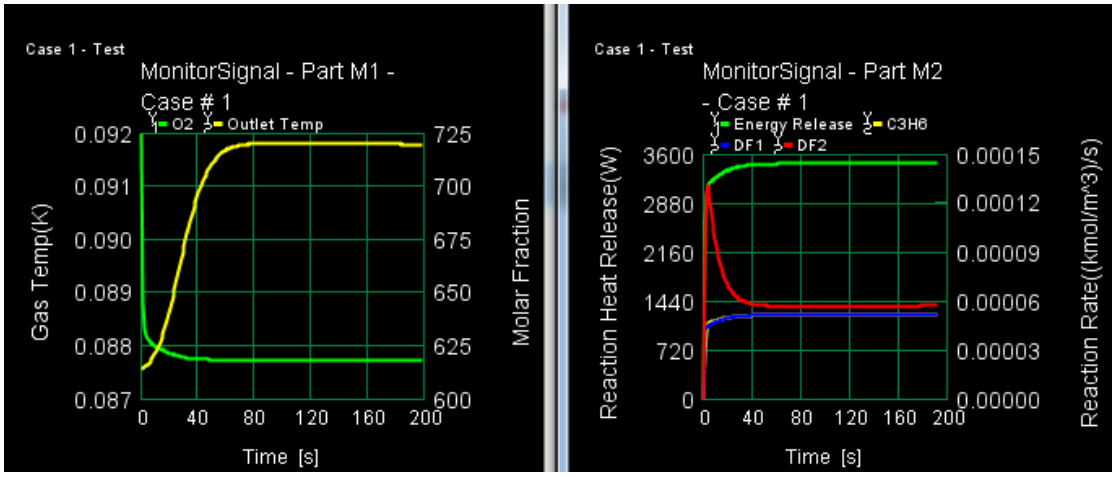
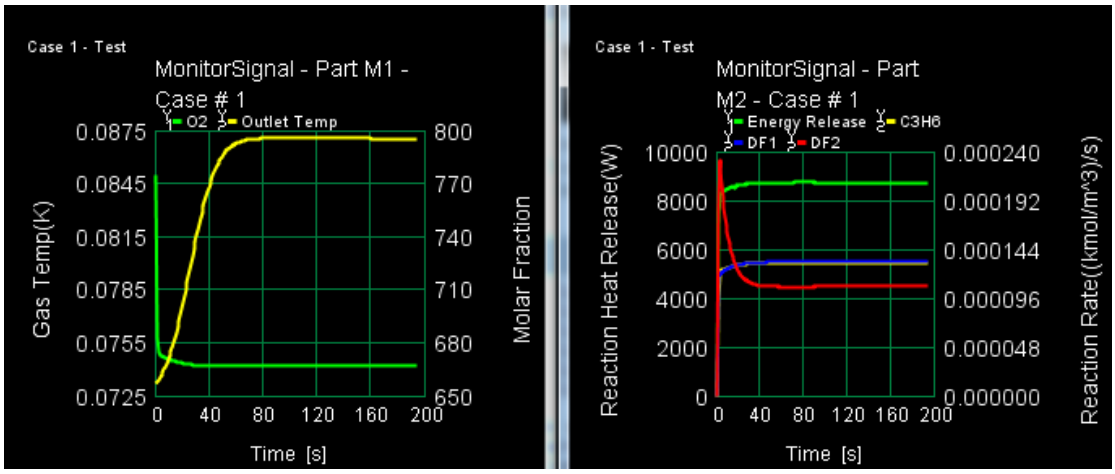
Supporting Information

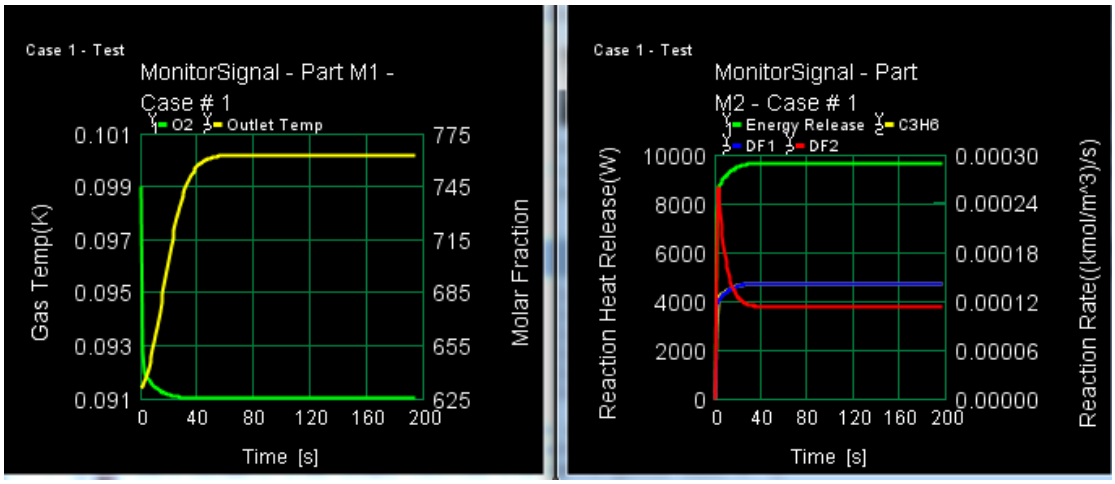
In order to prove that the quick approach to steady state of oxygen consumption rate can induce approximately steady state of reaction heat release. We use DOC example offered by the commercial software "GT-POWER" to simulate the step response of HC dosing. The results are shown as follow. From the simulation, reaction heat and oxygen consumption has a fast response to step dosing. Even in the light duty condition which mass flow rate is 132.5kg/h, 90% heat release has been approached less than 6 seconds. As a result, it's reasonable to consider that the relation between dosing rate term u_{inj} and heat release term φ is approximate to zero-order.



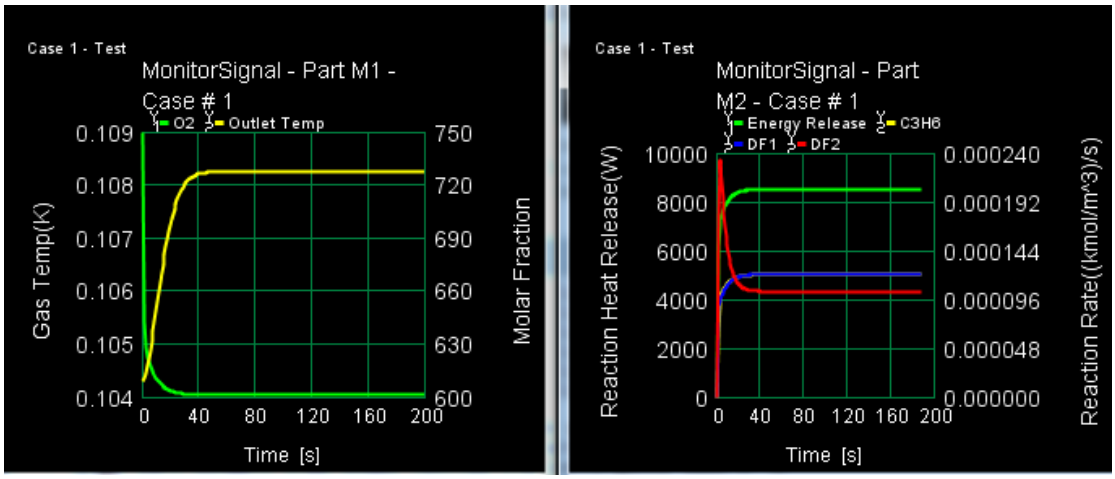
(a) m_{exh}=132.5kg/h; T_{exh}=614K; u_{inj}=0.2g/s



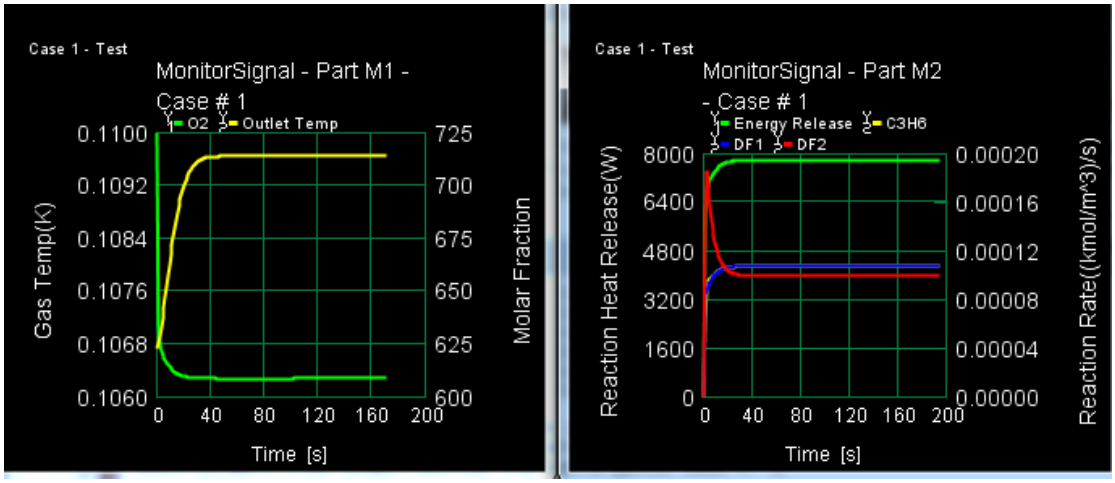
(b) m_{exh}=199kg/h; T_{exh}=657K; u_{inj}=0.5g/s



(c) m_{exh}=299.8kg/h; T_{exh}=631K; u_{inj}=0.6g/s



(d) m_{exh}=427.2kg/h; T_{exh}=608K; u_{inj}=0.6g/s



(e) m_{exh}=518kg/h; T_{exh}=621K; u_{inj}=0.6g/s