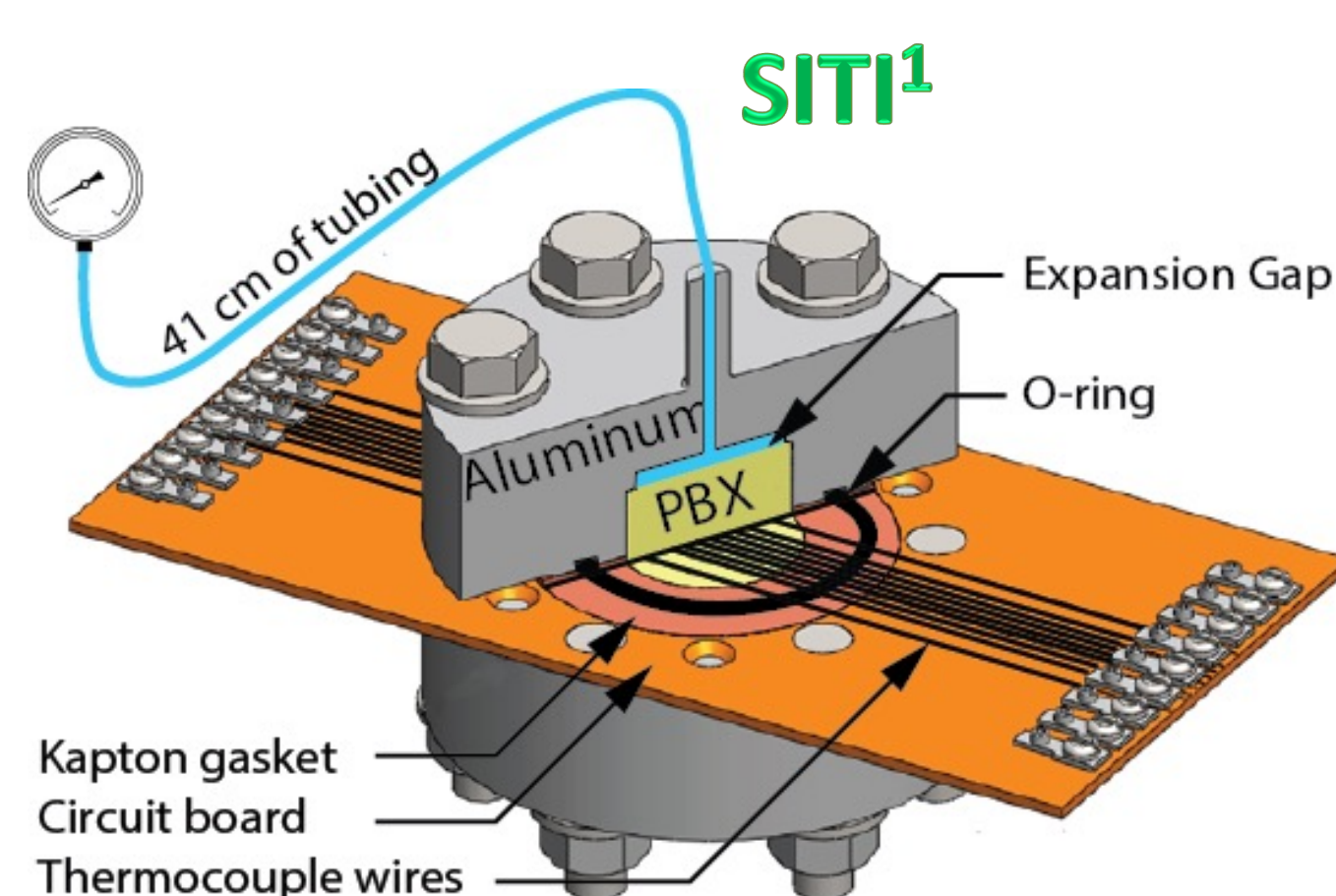




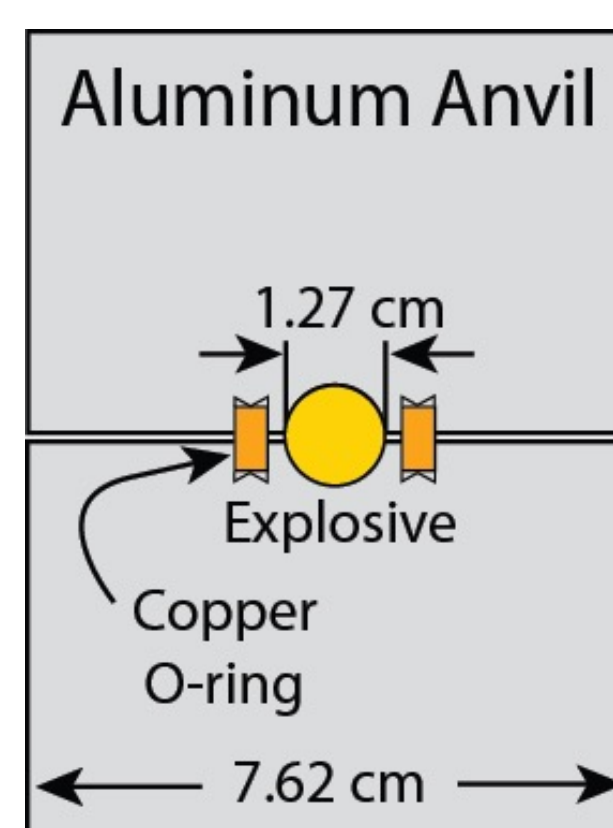
Cookoff Reaction Violence

Michael L. Hobbs^a, Jonathan Baker^b, Malcolm D. Cook^c, Michael J. Kaneshige^a, Shane C. Schumacher^a, and Christopher Stennett^d

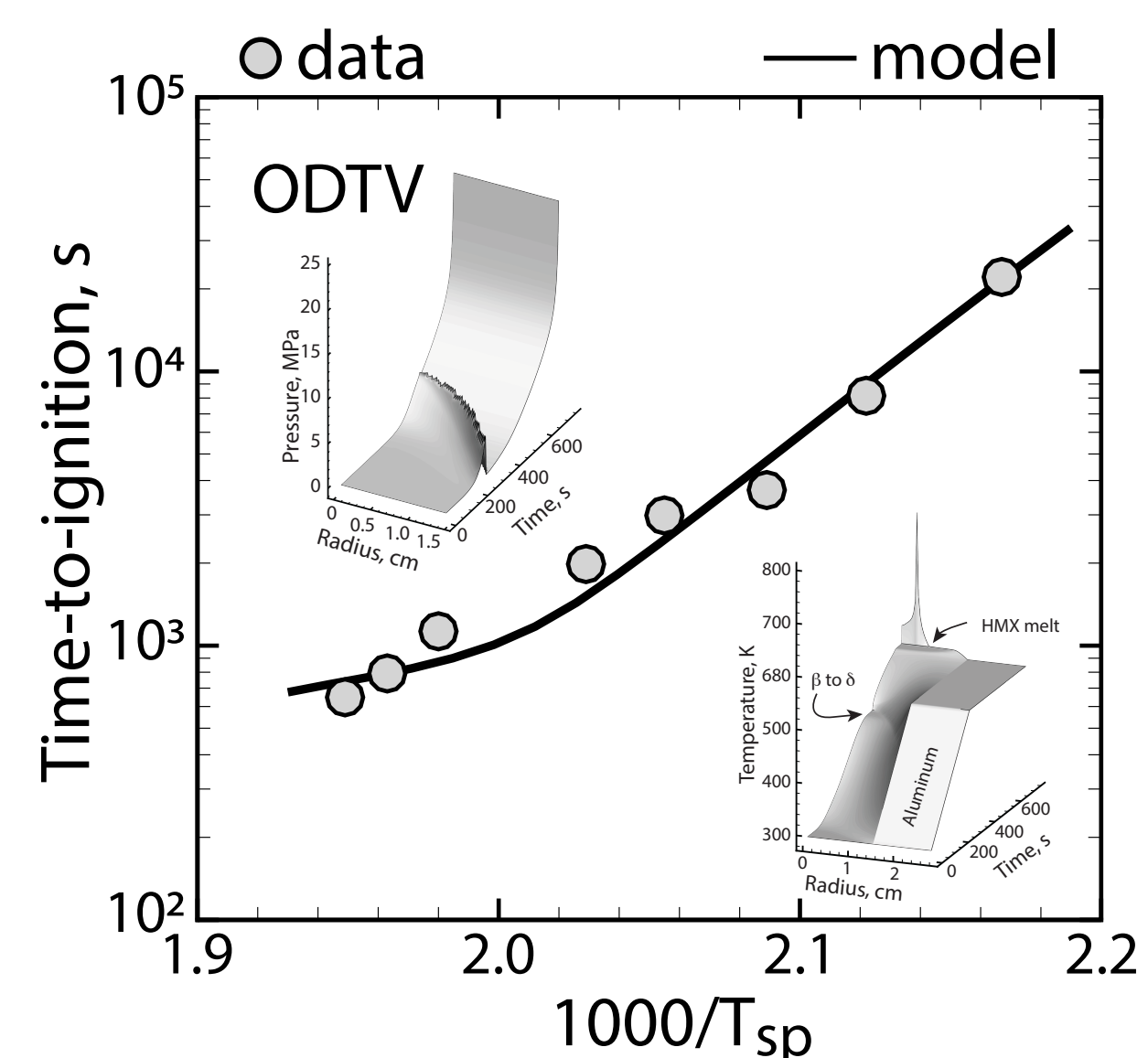
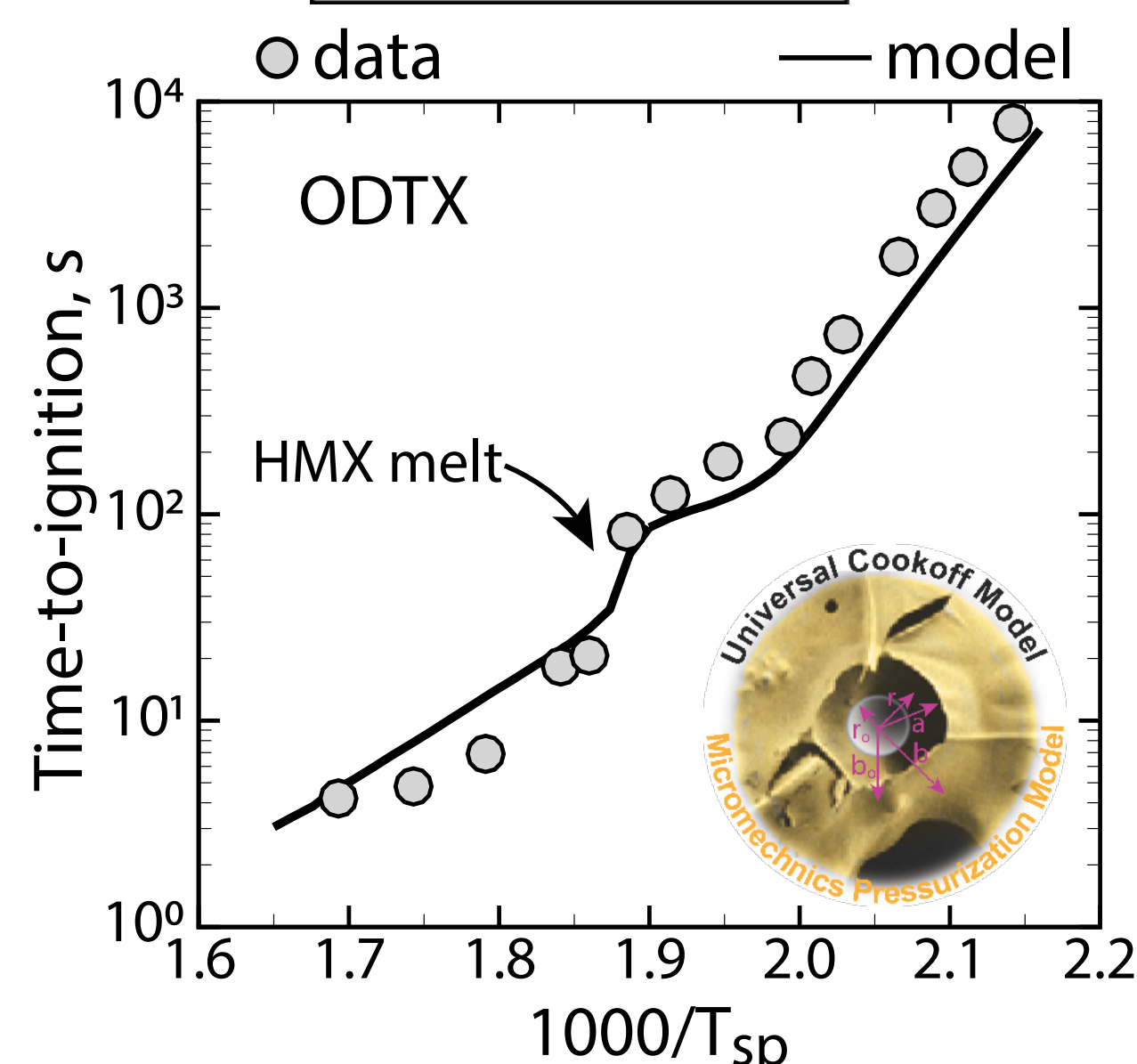
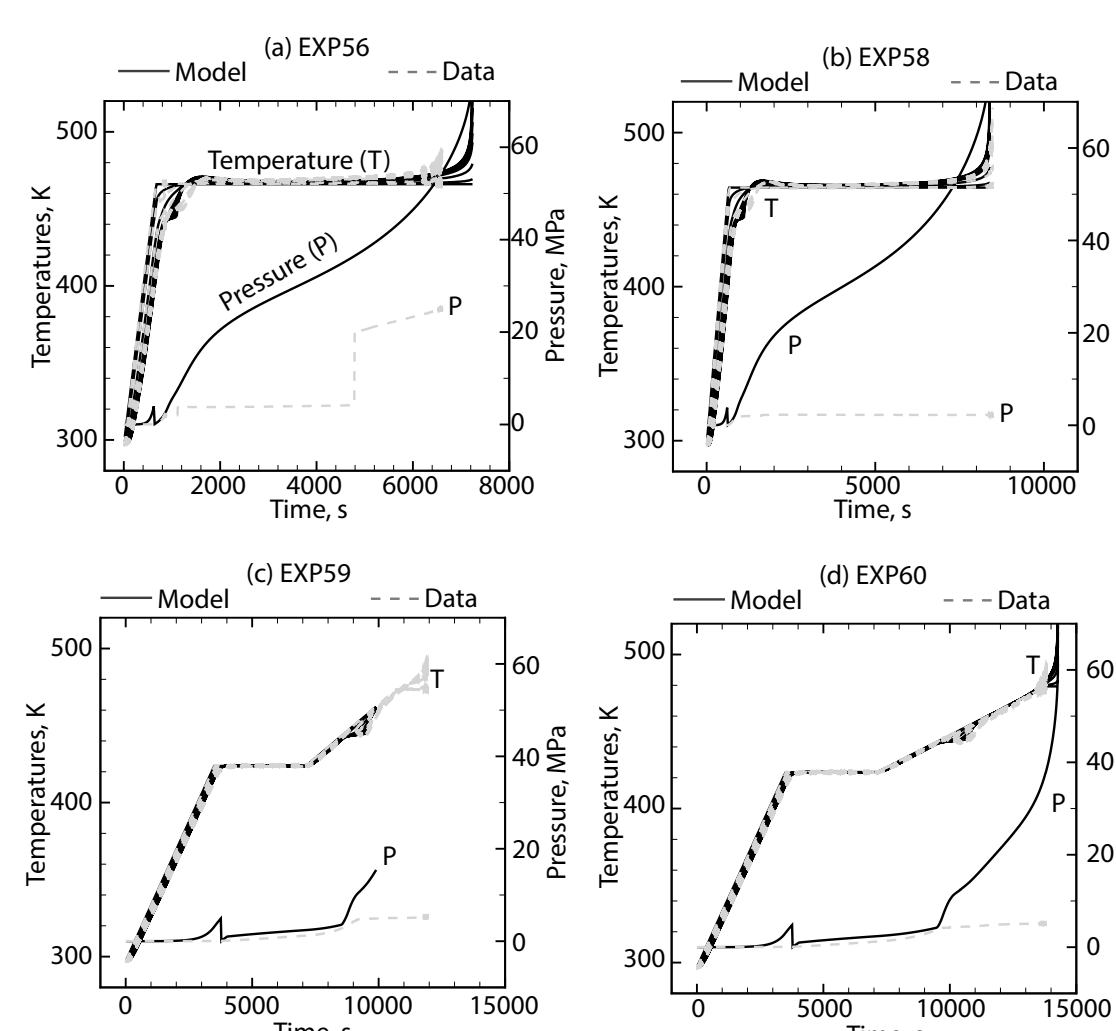
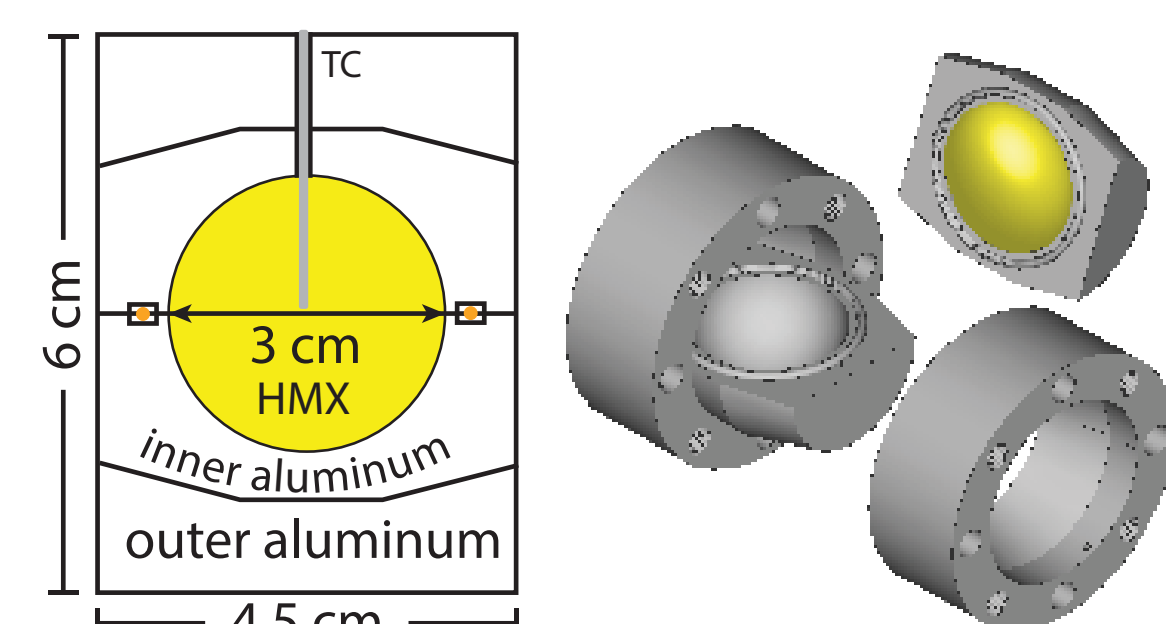
Thermal ignition



ODTX²



ODTV³

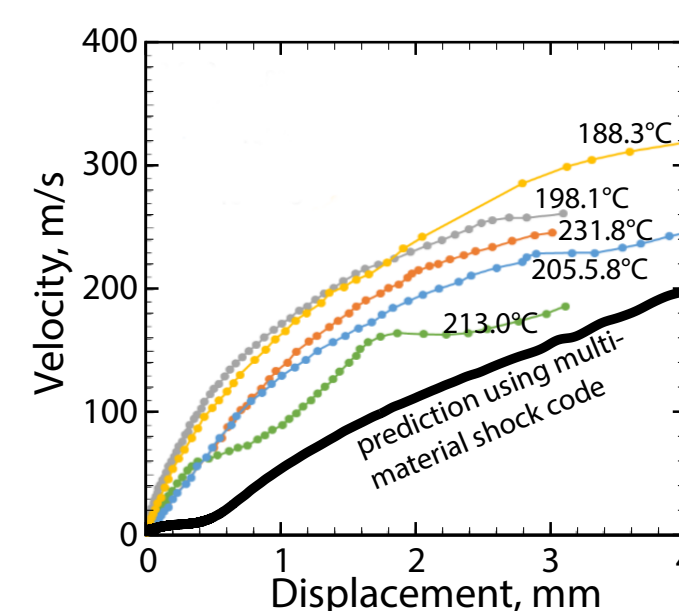
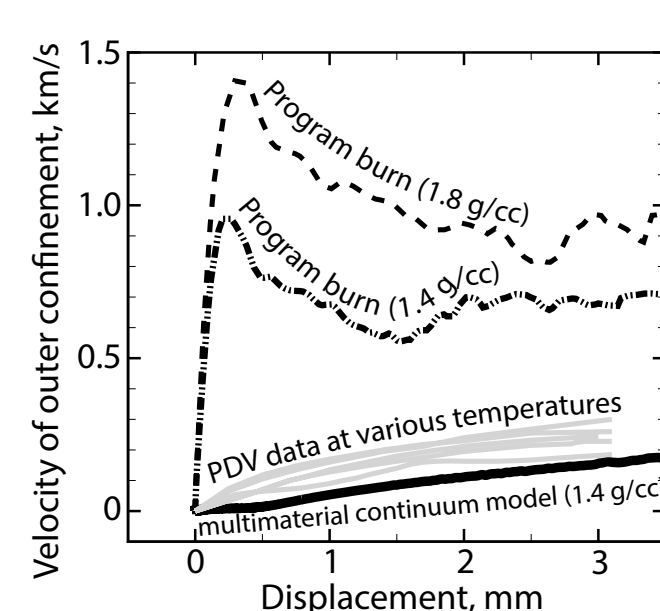


¹Sandia instrumented thermal ignition

²One-dimensional time-to-ignition

³One-dimensional thermal violence

Post thermal ignition violence



S is characteristic fragment size

$$S = \left(\frac{\sqrt{24}K \left(1 - \frac{T}{T_m} \right)^n}{\rho c \dot{\epsilon}} \right)$$

Number of fragments = V_{alum}/S^3

Fragmentation is a function of:

- Fracture toughness, K
- Set point temperature, T
- Aluminum melting point, T_m
- Aluminum density, ρ
- Aluminum sound speed, c
- Aluminum strain rate, $\dot{\epsilon} = V/\text{disp.}$

Number of inner vessel fragments

