

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Explosive behavior of binary drops upon impact on a hot solid

PIERRE CHANTELOT, PALLAV KANT, JULIETTE COLIN, Physics of Fluids group, University of Twente, ANDREA PROSPERETTI, Physics of Fluids group, University of Twente and Department of Mechanical Engineering, University of Houston, DETLEF LOHSE, Physics of Fluids group, University of Twente and Max Planck Institute for Dynamics and Self-Organization — The vapor layer generated during the impact of a drop on a hot plate can prevent contact between the liquid and solid. The minimum temperature, T_L , needed to observe this dynamic Leidenfrost effect depends on the impact speed, and the thermal properties of the solid and liquid. Here, we perform impacts of binary drops of miscible liquids with different boiling points while monitoring the existence of contact using Total Internal Reflection (TIR) imaging. We report the occurrence of explosions, associated with a sudden failure of the vapor film, at the transition from levitation to contact. We study the destabilization of the vapor layer by measuring its dynamics for different liquid combinations and mixing ratios.

Pierre Chantelot
Physics of Fluids group, University of Twente

Date submitted: 29 Jul 2019

Electronic form version 1.4