Atomic Analysis of Dwell-penetration Transition for Oblique Targets

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The penetration response of silicon carbide has been a topic of interest for decades due to its applications in areas as diverse as understanding impact effects and modification of physical properties of metals. Using molecular dynamics method, we studied the interface defeat of nano gold rods impacting oblique silicon carbide. We found that the radius of incident rod has no obvious effects on the dwell-penetration transition velocity. Dwell happens when incident rod fails on the surface of target silicon carbide and gold atoms attaches on the surface as lubricant. The microscopic lubricating and viscosity effect of copper buffer is studied in this work, which highly increases the transition velocity. Through microscopic discussions, we provide further understanding of the mechanics of dwell for oblique targets.

Keywords: interface defeat, dwell-penetration transition, molecular dynamics, oblique targets