Microjetting from a Grooved Metal Surface under Decaying Shocks

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Abstract : Using Molecular Dynamic (MD) simulations, we simulated the microjet from the metal surface under decaying shock loading. The microjetting processes under release melting conditions are presented in detail, and some properties on the microjet mass and velocity are revealed. The phased increase of microjet mass with shock pressure is found. For all cases, the ratio of the maximal jetting velocity to the surface velocity approximately keeps a constant for liquid state. In addition, the temperature of the microjet can be always above the melting point. When introducing slow decaying profiles, the microjet mass begins to increase with the decay rate, which is dominated by the deformation of the bubble during pull-back. When the decay rate becomes fast enough, the microspall occurs as expected, meanwhile, the microjet appears to reduce because of the shock energy reduction.