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Microstructure effects on shock-induced surface jetting BO LI, SHENG-NIAN LUO, The Peac Institute of Multiscale Sciences, THE PEAC INSTITUTE OF MULTISCALE SCIENCES TEAM — We investigate shock-induced surface jetting from grooved Cu as regards microstructure effects, including jetting mass/velocity ratios, directionality, jetting phase diagram, secondary jetting, and underlying mechanisms. The grooves are of wedged, cylindrical, and rectangular shapes. Other microstructure features explored are half angles, crystal structure asymmetry as represented by grain boundaries, geometrical asymmetry, and deformation heterogeneity. The common fundamental mechanism is that jetting is driven by stress gradients due to transverse mass collision. For symmetrical wedged grooves, the velocity ratio increases linearly with decreasing half angle. However, the jetting factor or mass ratio reaches the maximum at certain intermediate half angle. An impact strength vs. half angle phase diagram is established for a typical case of wedged grooves, useful for predicting the critical parameters for jetting. Small asymmetries may induce considerable deviation of the jetting direction. Wedged, cylindrical, and rectangular grooves form a geometrical hierarchy. Primary jetting can be well described with wedged grooves, and secondary jetting is a result of collision of primary jets. Rectangular grooves may yield pronounced, velocity-enhanced, secondary jetting.

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