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Investigation of dynamic friction induced by shock loading conditions ANTOINE JUANICOTENA, STEPHANIE SZARZYNSKI, Commissariat a l'Enegie Atomique, Centre Ile de France, BP12, 91680 Bruyeres-le-Chatel, France
— Modelling the frictional sliding of one surface against another under high pressure is often required to correctly describe the response of complex systems to shock loading. In order to provide data for direct code and model comparison, a new dynamic friction experiment investigating dry sliding characteristics of metal on metal at normal pressures up to 10 GPa and sliding velocities up to 400 m/s has been developed. The test consists of a specifically designed target made of two materials. A plane shock wave generated by plate impact results in one material sliding against the other. The material velocity of the rear surface of the target is recorded versus time by Doppler Laser Interferometry. The dynamic friction coefficient μ is then indirectly determined by comparison with results of numerical simulations involving the conventional Coulomb law. Samples can also be recovered in order to carry out metallographic analyses of sub-surface deformation at the interface. Using this new experimental configuration, three dynamic friction experiments with various impact speeds were performed on AA 5083-Al (H111) / AISI 321 stainless steel tribo-pair. Results suggest a decrease in the friction coefficient with increasing sliding velocity, a classic experimentally observed phenomenon.

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