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Transition from solid to liquid spall in tin under laser shocks of increasing intensity THIBAUT DE RESSEGUIER, CNRS, LOIC SIGNOR, CEA, ANDRE DRAGON, PIERRE SEVERIN, MICHEL BOUSTIE, CNRS, LCD TEAM, CEA TEAM, LMPM TEAM — When a shock-loaded target is melted on compression or on release, the tensile stresses generated upon reflection of the pressure pulse from a free surface are induced in a liquid state. Instead of the well-known spallation process occurring in solid targets, cavitation takes place in the melted material and liquid fragments are ejected from the free surface. Although increasing interest is manifested on the subject, related data are still scarce. In a recent paper, we have reported an exploratory investigation of liquid spall in tin samples submitted to laser shocks of very high intensities [*J. Appl. Phys.* **101**, 013506, 2007]. Here, we present new experimental results obtained over a lower pressure range (∼14 to 60 GPa), where we focus on the progressive transition from the ductile behaviour of solid tin to the cavitating spall expected above melting. Both time-resolved free surface velocity measurements and post-test examination of the recovered samples clearly show such transition. The drop in tensile strength associated with melting is evaluated from the velocity profiles. Detailed views of the fracture surfaces provide an insight into the cavitation process. Experimental data are compared to preliminary computations.

Thibaut De Resseguier
CNRS

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