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Ductile spall in copper of different structure B. HERRMANN, E. ZARETSKY, Ben Gurion University, Beer Sheva, Israel, G.I. KANEL, Joint Institute for High Temperatures, Moscow, Russia, S.V. RAZORENOV, Institute of Problems of Chemical Physics, Chernogolovka, Russia — The spall signals and post mortem metallography of crystals of Cu+0.1%Si solid solution and copper with sub-micron silica inclusions were studied in planar impact experiments at two different load durations. The samples contained large (4-5 mm in diameter) grains with [100] axes parallel to the sample normal. Fractography of the spall surfaces correlate with the free surface velocity histories. The main fracture surface of the Cu+0.1%Si grains consists of dimples $\sim 5\ \mu\text{m}$ to $50\ \mu\text{m}$ diameter. The fracture surfaces of copper with silica inclusions are covered by a net of dimples of $1\ \mu\text{m}$ to $5\ \mu\text{m}$ size some of which contain Si particles. In both cases the grain boundaries crossing the fracture surface are partially open and covered by a fine net of tensile dimples of $\sim 5\ \mu\text{m}$. The free surface velocity histories demonstrate prolonged spall fracture process for Cu+0.1%Si samples and faster fracture at lower fracture stress for copper with brittle inclusions.

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