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Study of dislocation walls evolution during spall in pure aluminum BENNY GLAM, Ben-Gurion University, SHALOM ELIEZER, DANIEL MORENO, Soreq Nuclear Research Center, DAN ELIEZER, Ben-Gurion University — The micro-structure of the spall plane of pure aluminum (99.9999%) was investigated in symmetric plate impact experiments. The aluminum targets were first heated at 450^{o}C for 22 h for grain growth. The impacted targets were softly caught and collected for metallurgical analysis. It was found that at weak impacts with partial spall, voids with average size of 50$\pm$10 μm were developed along the grain boundaries. The grain size in the vicinity of the voids is 50-250 μm, smaller than their size in the rest of the specimen: 400-1000 μm, revealing that the grains split into smaller grains when dynamic tension is applied. Transmission Electron Microscopy (TEM) and electron diffraction revealed evaluation of parallel dislocation walls, that create a sub-grain micro-structure inside grains with (011) orientation. In grains with other orientations no dislocation walls or sub-grain structure was found. These findings reveal a dislocation glide mechanism along {111} planes during the spall process in an fcc aluminum.

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