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Study on the characteristics of dynamic damage in ultrapure Aluminum with 2D and 3D method MEILAN QI[1], BIXIONG BIE, School of Science, Wuhan University of Technology, CHANGMING HU, HONGLIANG HE, National Key Laboratory of Shock Wave and Detonation Physics, Institute of Fluid Physics, CAEP, XIAOXIA RAN, DUAN FAN, School of Science, Wuhan University of Technology, SHENGNIAN LUO, The Peac Institute of Multiscale Sciences, Sichuan University — Based on the metallographic analysis, electron back scattering diffraction and 3D tomography with synchrotron x-ray method, the characteristics and laws of damage distribution in ultrapure aluminum with different degree under shock loading are characterized and analyzed. Some microscopic characteristics of damages are worthy of attention. Under the lower-velocity impact, the spherical void will grow in isolation, and the space distribution of voids is uneven in the area with same tensile stress, which is related to the microstructure of the material. Under higher-velocity impact, the voids will grow bigger and connect each other, which lead to the concentrated area of damage. The space distribution of voids and the connecting form of two voids can be found clearly from the 3D analysis result. Moreover, the result of electron back scattering diffraction shows that the emitted dislocation will appear during the growth process of voids, which accelerates the growth of voids and make the voids easy to coalesce each other.

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