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The effect of phase transition on the failure behaviors of PZT 95/5 under shock compression FUPING ZHANG, HONGLIANG HE, GAOMIN LIU, YUSHENG LIU, Institute of Fluid Physics, P. O. Box 919-102, Mianyang, Sichuan 621900, People's Republic of China — PZT 95/5 ferroelectric ceramics has been utilized for the use in shock driven pulsed power supplies for many years. In previous studying, the low impendence failure layer had been confirmed in PZT 95/5 when the shock pressure is up to 2.4 GPa. But to the shock compression of the poled PZT 95/5, the failure behavior of this material is still unknown. In this paper, the failure behaviors of axially poled PZT 95/5 have been tested by measuring the particle velocity of the rear free surface at different pressures. Results show that the failure layer exists in poled PZT 95/5 when the shock pressure reaches 2.4 GPa. Through analysis the velocity profile of free surface, which shows that the velocity of failure layer is the same as the shock-wave speed and the delay time decreases with increasing the shock stress. Comparing the failure behaviors of unpoled PZT 95/5, it finds that the threshold pressure and the velocity of failure layer are the same, but the delay time in poled PZT 95/5 is slight higher than that in unpoled PZT 95/5. The FE to AFE phase transition has been suggested to explain the increase of the delay time in poled PZT 95/5.

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