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Shock induced phase transition of different TiO_2 precursors¹ PENGWAN CHEN, XIANG GAO, State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, JIANJUN LIU, State Key Laboratory of Chemical Resource Engineering, Beijing University of Chemical Technology, Beijing, China, QIANG ZHOU, State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology — To investigate the effects of phase composition and particle size on shock-induced phase transition of TiO_2 , different TiO_2 precursors including MC-150 TiO₂(pure anatase,5nm), P25 TiO₂(85% anatase/15% rutile,15nm), T2 TiO₂(pure anatase, 35nm) and T1 TiO₂(pure rutile, 24nm) were impacted by detonation-driven high velocity flyers. Powder X-ray diffraction(XRD) was used to characterize the phase composition of recovered samples. Two types of phase transition were observed, including anatase to rutile transition and anatase to high pressure phase of srilankite transition. The phase transition mechanisms and effects of shock conditions, initial phase composition and particle size were analyzed. Complete transition from anatase to srilankite can be obtained by adjusting the shock conditions. In the case of impacting pure P25 TiO_2 , anatase to srilankite transition was hardly observed, which may be due to the restraint of initial phase of thermodynamically stable rutile. However, in the case of impacting a mixture of P25 TiO_2 and dicyandiamide($C_2N_4H_4$), it is interesting to observe anatase to srilankite transition and the mechanisms was analyzed.

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