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Shock induced alpha-epsilon martensitic transition in iron modeled by phase field with reaction pathways CHRISTOPHE DENOUAL, CEA, DAM, DIF — Pressure induced α-ϵ martensitic transition (MT) in iron is known to be very complex due to the interplay of transformation strains and long range stresses induced by the emerging microstructure. We propose a predictive modeling of this MT during shock loading by using the phase field technique with reaction pathway (PFRP), which allows for a precise definition of both elastic energy and crystalline energy along the martensitic reaction path. After a short introduction to PFRP, a discussion about the microstructure obtained during shock and after reversion to alpha phase (just after shock release) will be proposed.

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