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Measurement of strength in shocked iron across the alpha-epsilon transition DAVID WOOD, GARETH APPLEBY-THOMAS, AMER HAMEED, JONATHAN PAINTER, Cranfield University, NEIL BOURNE, University of Manchester, JEREMY MILLETT, AWE — There has been a plethora of investigations concerning the martensitic phase transformation of BCC iron to its HCP polymorph at 13 GPa and the Hugoniot of iron has been measured many times illustrating this shock-induced phase transformation. However all previous work has been unable to assess the deviatoric (shear) stresses in either the mixed phase (α and ε) region or the high pressure phase (ε) as the transformation proceeds. This work has attempted to directly measure lateral stresses in one-dimensional shock loading of this material for the first time above and below the phase transition. Through knowledge of both longitudinal and lateral stresses, the shear strength can be deduced. Measurements have been taken both above and below the transformation stress and the results discussed.

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