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Nonlinear acoustic effects from dislocation-based hysteretic kinking solids under stresses PETER FINKEL, Thomson/Rowan University, MATHIEU FRASCZKIEWICZ, Drexel University, MICHEL BARSOUM, Drexel University — We argue that proposed recently mechanism explaining inelastic hysteresis in non-linear elastic systems indeed can be explained by means of formation of dislocation-based incipient kink bands (IKB). Using acoustic waves we investigated possible dislocation related mechanisms responsible for nonlinear dynamic response of IKB solids. In this work, for the first time we observed IKB formation and reversibility directly using acoustic coupling technique (ACT) measuring ultrasonic waves attenuation as a function of stress and acoustic emission signatures during compression test of nanolaminated layered ternary carbide (MAX phases) samples. We confirm here that the dynamic behavior of these non-linear elastic systems is due to the interaction of dislocations with the stress waves.

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