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Atomic transformation pathways from THz radiation generated by shock-induced phase transformations[1] EVAN REED, Stanford University, MICHAEL ARMSTRONG, KI-YONG KIM, JAMES GLOWNIA, MIKE HOWARD, EDWIN PINER, JOHN ROBERTS — We have recently made the first experimental observation of THz frequency radiation emitted from elastically strained piezoelectric GaN and utilized this new phenomenon as an ultrafast diagnostic. Using molecular dynamics simulations coupled to Maxwell's equations, we find that similarly detectable THz frequency radiation can be emitted when a wurtzite structure crystal transforms to a rocksalt structure under shock compression on picosecond timescales. We show that information about the atomic-scale transformation pathway is contained in the sign of the emitted THz electric field and information about the kinetics is contained in the time-dependence. This new phenomenon provides an avenue to experimental measurement of microscopic transformation pathways in crystals on the shortest timescales.

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