

Abstract Submitted  
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**Photo-Induced Structural Dynamics of Graphite Studied by Ultrafast Electron Crystallography.**<sup>1</sup> RAMANI K. RAMAN, RYAN A. MURDICK, YOSHIE MUROOKA, CHONG-YU RUAN, Michigan State University — The graphite to diamond conversion is believed to involve the rhombohedral phase of graphite as an intermediate state. Using ultrafast electron crystallography, we have observed the formation of transient interlayer  $sp^3$  bonds in graphite beyond a threshold fluence, leading to a non-thermal structural change (Raman, R. K. et al. Phys. Rev. Lett. 101, 077401 (2008)). This transient rebonding towards diamondization is likely driven by a compressive Coulomb stress created by the photoinduced charge separation following the initial  $E_{2g}$  phonon excitation that alters the layering symmetry within graphite.

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