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EXAFS Studies of the Local Bonding Structures of $Ge_2Sb_2Te_4$, $Ge_2Sb_2Te_5$, AND $Ge_2Sb_2Te_7$ JOSEPH WASHINGTON, MICHAEL PAESLER, DAVE BAKER, GERALD LUCOVSKY, North Carolina State University, CRAIG TAYLOR, Colorado School of Mines — Bond constraint theory (BCT) and rigidity theory provide powerful frameworks for understanding the structure and properties of a-materials. Application of these theories to switching in a-chalcogenides holds the promise of finding the ideal a-chalcogenide suited for switching applications. Recently a-chalcogenide switching of $Ge_2Sb_2Te_5$(GST) has been applied successfully to programmable memory devices as well as DVD technology - where the quest for the discovery of better-suited materials continues. Extended X-ray Absorption Fine Structure (EXAFS) spectroscopy is an ideally suited technique to investigate the switching properties of these materials. We analyze films of amorphous $Ge_2Sb_2Te_4$, $Ge_2Sb_2Te_5$, and $Ge_2Sb_2Te_7$ through EXAFS and propose predictions of their aptitude for reversible phase change using bond constraint theory.

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