Zinc-blende to Rock-salt transition in SiC in a Laser-Heated Diamond-Anvil Cell

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We explore the stability of the ambient pressure zinc-blende polymorph (B3) structure of silicon carbide (SiC) at high pressures and temperatures where it transforms to the rocksalt (B1) structure. We find that the transition occurs ~40 GPa lower than previously measured when heated to moderately high temperatures. A lower transition pressure is consistent with the transition pressures predicted in numerous *ab initio* computations. We find a large volume decrease across the transition of ~17%, with the volume drop increasing at higher formation pressures, suggesting this transition is volume driven yielding a nearly pressure-independent Clapeyron slope. Such a dramatic density increase occurring at pressure is important to consider in applications where SiC is exposed to extreme conditions, such as in industrial applications or planetary interiors. We find that if we include the B3 to B1 transition in SiC, the mass-radius curve for a carbon-rich planet is nearly indistinguishable from that of a silicate planet.