Presolar silicon carbide, identified by anomalous $^{12}$C/$^{13}$C, have long been the only direct physical sampling of asymptotic giant branch stars and Type-II supernovae (SNII) ejecta. The bulk of non-novae grains form in the dust clouds of 1-3M☉ carbon stars in the thermally pulsing asymptotic giant branch (AGB) phase of their life. While these grains have been extensively studied for their unique isotopic signature characteristic of their exotic origin and trace gasses carrying the s-process and r-process nucleosynthetic signature, to date studies on their structures of presolar grains have been limited to electron diffraction surveys using transmission electron microscopy. We present high-resolution single-crystal structural refinement of presolar silicon carbides determined using data synchrotron x-ray diffraction data collected at Advanced Photon Source. Preservation and resolvability of the circumstellar pressure/temperature regime was determined with an examination of nanostrain states in several grains of presolar silicon carbide. By accounting for the environment present at (1) circumstellar formation, (2) interstellar transport, and (3) asteroidal and meteoritic storage and shock environments we hope to open a new opportunity to directly study the limits of our theoretical understanding of stellar structures.