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Pressure-induced disappearance of superconductivity across isostructural transition in underdoped $Bi_2Sr_2CaCu_2O_{8+\delta}$ JIAN-BO ZHANG, Department of Physics, South China University of Technology, Guangzhou 510640, China, XIAO-JIA CHEN, Geophysical Laboratory, Carnegie Institution of Washington, Wanshington, DC 20015, USA, LING-YUN TANG, ZHEN-XING QIN, JIANG ZHANG, Department of Physics, South China University of Technology, Guangzhou 510640, China, MIKHAIL EREMETS, Max Planck Institute fr Chemie, Mainz 55020, Germany, JING LIU, Institute of High Energy Physics, Chinese Academy of Science, Beijing 100190, China, JIN-SHENG WEN, ZHI-JUN XU, GENDA GU, Condensed Matter Physics and Materials Science, Brookhaven National Laboratory, Upton, New York 11973, USA, HO-KWANG MAO, Geophysical Laboratory, Carnegie Institution of Washington, Washington, DC 20015, USA — There exist rich phenomena in the underdoped regime of cuprate superconductors. An underdoped $Bi_2Sr_2CaCu_2O_{8+\delta}$ single crystal is chosen to investigate the pressure-driven evolution of the superconducting behavior and structural properties by electrical resistance and synchrotron X-ray diffraction measurements. We find that an isostructural phase transition starts at 16.0 GPa and a structural collapse occurs at around 23.7 GPa. Meanwhile, superconductivity is observed to disappear and superconductor-insulator transition takes place across the phase transition. These results suggest that the Fermi surface topology could undertake some modification at high pressures.

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