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Pressure-Induced Decomposition of Hydrogen Peroxide JING-YIN CHEN, Institute for Shock Physics, MINSEOB KIM, CHOONG-SHIK YOO, Institute for Shock Physics, Washington State University, Pullman WA, DANA DATTELBAUM , STEVE SHEFFIELD, Los Alamos National Laboratory, Los Alamos, Albuquerque, NM — We have studied the pressure-induced chemical decomposition of pure (∼97.5%) hydrogen peroxide to 50 GPa, using confocal micro-Raman and synchrotron X-ray diffraction. Our results indicate that pure hydrogen peroxide crystallizes into a tetragonal structure ($P4_12_12$), the same structure of 90 % H_2O_2 previously reported below 8 GPa and of pure H_2O_2 at low temperatures. The tetragonal phase (H_2O_2-I) is stable to 15 GPa, above which transforms into an orthorhombic structure (H_2O_2-II) over a large pressure range between 15 and 20 GPa. The diffraction pattern of H_2O_2-II is analogous to that of ε-oxygen, suggesting a similar packing of oxygen atoms between H_2O_2-II and ε-O_2. In fact, we found that H_2O_2-II eventually decomposes to into H_2O and O_2 at 45 GPa.

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