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X-ray induced mobility of molecular oxygen at extreme conditions MICHAEL PRAVICA, Univ of Nevada - Las Vegas, DIMITRY POPOV, STANISLAV SINOGEIKIN, HPCAT, Geophysical Laboratory, Carnegie Institution of Washington, DANIEL SNEED, QUINN SMITH, GRIFFIN GUARDALA, Univ of Nevada - Las Vegas — We report an in situ Raman study of KClO4 irradiated with x-rays in a diamond anvil cell. Decomposition via KClO4 + hv → KCl + 2O2 was monitored via the O2 vibron at 2 GPa, 6 GPa and 9 GPa. For all pressures, the vibron grew in intensity and then diminished after successive irradiation suggesting that O2 was diffusing away from the irradiated region. Surprisingly, the diffusion rate accelerated with pressure increase, indicating that the nonhydrostatic pressure gradient was likely driving molecular diffusion of oxygen. At 9 GPa, the vibron bifurcated suggesting that O2 exists as two forms: interstitial and bulk solid. This method can be employed to study molecular diffusion under extreme conditions.

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