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Dissociation of $CaIrO_3$-type $MgSiO_3$ in the gas giants[1] KOICHIRO UMEMOTO, RENATA WENTZCOVITCH, Minnesota Supercomputing Institute and Department of Chemical Engineering and Materials Science, University of Minnesota, PHILIP ALLEN, Department of Physics and Astronomy, Stony Brook University — $CaIrO_3$-type $MgSiO_3$ is the planet-forming silicate stable at pressures and temperatures (PTs) beyond those of Earth's core-mantle boundary. We have found using first principles quasiharmonic free energy computations that this mineral dissociates into MgO and SiO_2 at PTs expected to occur in the cores of the gas giants ($>\sim$10 Mbar, 10,000 K). This transformation should be important also for modeling the internal structure of two recently discovered terrestrial exoplanets: a dense Saturn orbiting HD149026b and a super Earth orbiting GJ876d. We propose a low pressure route experiment to confirm this dissociation.

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