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Pressure-induced structural change in molten basalt CHRYSTELE SANLOUP, JAMES DREWITT, PHILLIP DALLADAY-SIMPSON, DONNA MORTON, University of Edinburgh, NACHIKETA RAI, VU University, Amsterdam, ZUZANA KONOPKOVA, DESY, Hamburg, WIM VAN WESTRENEN, VU University, Amsterdam, WOLFGANG MORGENROTH, DESY, Hamburg — Magmas are produced at depth in the Earth, and occurrences of their presence at greater depths are reported based on seismological information, such as the 410 discontinuity or atop the core-mantle boundary. Understanding the presence and eventual stability of magmas in the deep mantle requires a knowledge of their physical properties. However, this has been impeded for a long time due to the challenging nature of the experiments. In the recent years, structural and density information on silica glass have been obtained up to record pressures of up to 100 GPa, a first major step towards obtaining data on the molten state. Here, the structure of molten basalt is reported up to 60 GPa by means of in situ x-ray diffraction, and structural changes are evidenced. Silicon coordination increases from 4 at ambient conditions to 6 at 35 GPa, similarly to what has been reported in silica glass. Compressibility of the melt above completion of Si coordination change is lower than at lower pressure (P) conditions, implying that a single equation of state can not accurately describe density evolution of silicate melts over the whole mantle P-range. It also implies that melts can be buoyantly stable circa 35-40

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