INTRODUCTION

Pyroxenes belong to the hedenbergite-diopside-ferrosilite-enstatite, CaFeSiO₄-MgCaSiO₄-Fe₂SiO₄-Mg₂Si₂O₆ (Hd-Di-Enst) composition, and high-pressure behavior of pyroxene end-members is necessary for constraining the effect of cation substitution at the M1 and M2 octahedra. In the present work we report results from diffraction experiments on the Fe end-member, Fe₂Si₂O₆. Three polymorphs of synthetic FeSiO₃ have been observed at ambient conditions, namely orthoferrosilite (OFs, Pbcn), clinoferroelite (CFs, P2₁/c), and Fs-III (Lindsley et al. 1964). Subsequent structural investigation of these polymorphs demonstrated that Fs-III (PT) has a pyroxenoid structure (Weber 1983). At room temperature pure OFs converts into a C2/c phase at 4.2 GPa through a reconstructive transition (Hugh-Jones et al. 1996) while a natural OFs follows two metastable transitions: first, above 10.1 GPa, to the monoclinic P2₁/c phase (β-opx), and then, above 12.3 GPa, to a high-pressure orthorhombic phase Pbcn (γ-opx) (Dera et al. 2013). CFs transforms into a C2/c phase between 1.48 and 1.75 GPa with a volume decrease of 3% (Hugh-Jones et al. 1994). Here we report on a further single-crystal X-ray diffraction investigation of the compressional behavior of