The crystal structure of dolomite-IV, a high-pressure polymorph of dolomite, at 115 GPa

Merlini M.*[1], Cerantola V.[2], Gatta G.D.[1], Gemmi M.[3], Hanfland M.[2], Kupenko I.[2-4], Lotti P.[1], Müller H.[2] & Zhang L.[5]

[1] Dipartimento di Scienze della Terra "A. Desio", Università di Milano
[2] European Synchrotron Radiation Facility, Grenoble, France
[3] Centro per l'Innovazione delle Nanotecnologie @ NEST, Istituto Italiano di Tecnologia, Pisa
[4] Institute for Mineralogy, Westfälische Wilhelms-Universität, Münster, Germany
[5] Center for High Pressure Science and Technology Advanced Research, Shanghai, China

* *Corresponding email*: marco.merlini@unimi.it

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We report the crystal structure of dolomite-IV, a high-pressure polymorph of Fe-dolomite stabilized at 115 GPa and 2500 K. It is orthorhombic, space group *Pnma*, a = 10.091(3), b = 8.090(7), c = 4.533(3) Å, V = 370.1(4) Å^3 at 115.2 GPa and ambient temperature. The structure is based on the presence of 3-fold C_3O_9 carbonate rings, with carbon in tetrahedral coordination. The structure of dolomite-IV has not been predicted, but it presents similarities with the structural models proposed for the high-pressure polymorphs of magnesite, $MgCO_3$. A ring-carbonate structure match with spectroscopic analysis of high-pressure forms of magnesite-siderite reported in the literature, and, therefore, is a likely candidate structure for a carbonate at the bottom of the Earth's mantle, at least for magnesitic and dolomitic compositions.