

LETTER

α -PbO₂-type nanophase of TiO₂ from coesite-bearing eclogite in the Dabie Mountains, China

XIULING WU,^{1,2} DAWEI MENG,^{1,2,*} AND YUJING HAN¹

¹Testing Centre and Faculty of Earth Sciences, China University of Geosciences, Wuhan 430074, China

²Laboratory of Atomic Imaging of Solids, Institute of Metal Research, Academia Sinica, Shenyang 110015, China

ABSTRACT

A natural high-pressure phase of titanium oxide with α -PbO₂-structure has been found in omphacite from coesite-bearing eclogite at Shima in the Dabie Mountains, China. High-resolution transmission electron microscope observations have revealed an orthorhombic lattice, corresponding to α -PbO₂-type TiO₂ with cell parameters $a = 0.461$ nm, $b = 0.540$ nm, $c = 0.497$ nm and space group *Pbcn*. It occurs as nanometer-thick (<2 nm) lamellae between multiple twinned rutile crystals, providing additional evidence of very high-pressure, metamorphism at 7 GPa, 900 °C. This implies subduction of continental material to a depth of more than 200 kilometers. α -PbO₂-type TiO₂ could be an extremely useful index mineral for ultrahigh-pressure.