

Accepted Manuscript

Effects of pressure and water on electrical conductivity of carbonate melt with implications for conductivity anomaly in continental mantle lithosphere

Takashi Yoshino, Benjamin Gruber, Clayton Reinier

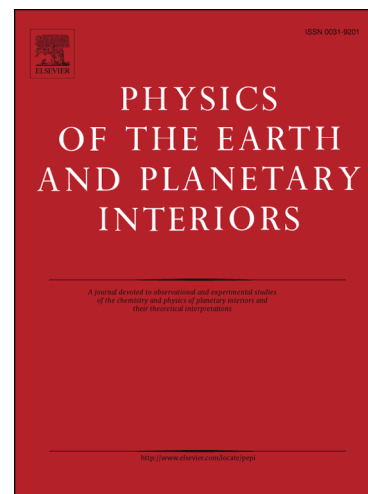
PII: S0031-9201(17)30333-3
DOI: <https://doi.org/10.1016/j.pepi.2018.05.003>
Reference: PEPI 6158

To appear in: *Physics of the Earth and Planetary Interiors*

Received Date: 8 December 2017
Revised Date: 3 April 2018
Accepted Date: 1 May 2018

Please cite this article as: Yoshino, T., Gruber, B., Reinier, C., Effects of pressure and water on electrical conductivity of carbonate melt with implications for conductivity anomaly in continental mantle lithosphere, *Physics of the Earth and Planetary Interiors* (2018), doi: <https://doi.org/10.1016/j.pepi.2018.05.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Effects of pressure and water on electrical conductivity of carbonate melt with implications for conductivity anomaly in continental mantle lithosphere

Takashi Yoshino^{1*}, Benjamin Gruber², Clayton Reinier³

¹Institute for Planetary Materials, Okayama University, Misasa, Tottori 682-0193 Japan

²Earth and Atmospheric Sciences, University of Alberta, 116 St. and 85 Ave., Edmonton, AB, Canada T6G 2R3

³Department of Geology and Geography, University of West Virginia, Morgantown, WV 26506, USA

Abstract The electrical conductivity of Na, Mg-bearing carbonate melts was measured in a Kawai-type multi-anvil apparatus as a function of pressure. The carbonate samples were mixtures of MgCO_3 and Na_2CO_3 or $\text{Mg}_5(\text{CO}_3)_4(\text{OH})_2 \cdot 4(\text{H}_2\text{O})$ and Na_2CO_3 . High-pressure experiments on the carbonate systems were performed up to 1800 K in a wide pressure range from 3.4 to 10.9 GPa. The sample conductivity abruptly changed at the eutectic temperature, which increased with increasing pressure. The hydrous carbonate yielded a lower eutectic temperature than the anhydrous carbonate and showed weaker pressure dependence. The molten state carbonates showed very high electrical conductivity with temperature dependence following the Arrhenius law. As the pressure increased, the conductivity decreased. The negative pressure dependence of the electrical conductivity of the hydrous carbonate melt was larger than that of the

Download English Version:

<https://daneshyari.com/en/article/8915672>

Download Persian Version:

<https://daneshyari.com/article/8915672>

[Daneshyari.com](https://daneshyari.com)