

Interactive comment on “Experimental study on the electrical conductivity of quartz andesite at high temperature and high pressure: evidence of grain boundary transport” by K. S. Hui et al.

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Thanks for your valuable comments and suggestions. Based on your suggestions, we revised our manuscript very carefully. (1) The language is polished by a professional company named Stallard Scientific Editing. (2) We reselect fitting circuit to fit the complex impedance at low frequency. The fitting results are in accordance with the experimental data. The experimental setup, collection of data, and the interpretation are amended very carefully. (3) The estimated errors in the conductivities are considered in the revised manuscript. These estimated errors are in a reasonable range. The detail response is as follows:

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1. The standard of English is too poor for it to be possible to review this manuscript without making assumptions as to the meaning of many sentences. The manuscript needs to be rewritten in standard English and resubmitted before any meaningful review of the content can be carried out. The language of this paper was amended by a professional company named Stallard Scientific Editing. According to these suggestions from the professional company, we amended our manuscript word by word and sentence by sentence. We hope that the revised version is acceptable for publication.

2. The description of the experimental methods is far too rudimentary. Although the experimental platforms and methods may have been described in previous publications sufficient detail needs to be included in this manuscript so that readers can understand the work carried out without having to read other publications. Thanks for the valuable suggestion. We have described the experimental setup, collection of data, and the interpretation very carefully in the revised manuscript.

3. Figure 2. The model does not fit the data very well. There needs to be some discussion of this. We have fitted our data at low frequency again using a resistance, capacitance, and Warburg element in parallel (the equivalent circuit is shown in Figure 2). In this way, more reliable data were achieved, and Figures 2-8 are amended accordingly. The conduction mechanism of grain boundary is also discussed in the revised manuscript.

4. Figure 7. The linear fit does not match the data at all. Why is this. Only the 1GPa data is plotted. The 0.5, 1.5 and 2GPa data should be plotted as well. Thanks for the valuable suggestion. We have plotted the 0.5-2.0 GPa data in Figure 7 in the revised version. The fitting linear is a trend line, and the estimated error is lower than 3%. We consider that the estimated error is within the reasonable range. This trend can represent the contribution of grain boundary (or grain interior) conductivity to the total conductivity under our experimental conditions.

5. Table 2. What are the estimated errors in the conductivities? The main estimated

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errors contain two parts: (1) the fitting program (Zview program) gives out the estimated error of grain interior, grain boundary, and total resistance which is lower than 5%, 7%, 5%, respectively; (2) the estimated errors of the activation enthalpy and pre-exponential factor are produced by the linear fitting, and the estimated errors are lower than 1%. These estimated errors are shown in Tables 2 and 3. We consider that the estimated error is within the reasonable range.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/7/C1000/2015/sed-7-C1000-2015-supplement.pdf>

Interactive comment on Solid Earth Discuss., 7, 1555, 2015.

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