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Solid Earth Discussions

Interactive comment on "Lithosphere tearing along STEP faults and synkinematic formation of lherzolite and wehrlite in the shallow subcontinental mantle" *by* Károly Hidas et al.

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The submitted to Solid Earth manuscript by Hidas et al., with title "Lithosphere trearing along STEP foults and synkinematic formation of lherzolite and wehrlite in the shallow subcontinental mantle" provides a study on mantle xenoliths demonstrating how microstructural features among their constituent minerals are related to the kind and degree of melt-rock interaction. The overall performance of this manuscript is excellent. It is well organized and the provided arguments are clear and well structured. To my knowledge it is first manuscript where throughout discussion about the relationships between melt percolation processes and deformation along a STEP fault. The authors

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Discussion paper

demonstrate how the microstructural data arising from the very detailed description of the EBSD data, can provide quantitative conclusions about the mass ration of the melt-rock. All figures are in good quality and the language, I am not a native English speaker, seems to me adequate. This manuscript is appropriate for publication to Solid Earth after minor revision. There are few point that need to be considered: 1. Chapter 5.1 Mineral major and trace elements: a more detailed mineralogical description is needed. 2. Page 7, line 6: why the accelerating voltage vary from 15 to 20 kV? 3. Page 7, line 12: Plagioclase up to 0.8% is high. Explain the origin of this plagioclase 4. Page 10, line 30: Opx with 2.5 wt% CaO is unusual for a mantle xenolith. Probably there are thin cpx exsolution lamellae. Check it. 5. Table 2: Thought there are calculated whole rock major element compositions there is a systematic inverse CaO/Al2O3 ratio. The CaO/Al2O3 ratio in non-metasomatized mantle peridotites is <1. In the case of Table 2, with exception of sample SOU-003, is the ratio CaO/Al2O3>1. Explain why. This is not consistent with reaction with undersaturated melts.

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