

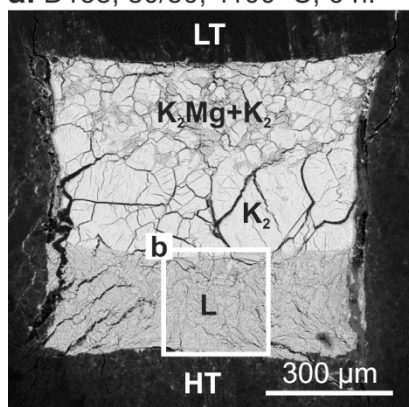
The K_2CO_3 – CaCO_3 – MgCO_3 join at 6 GPa: Implications for diamond forming carbonatitic melts

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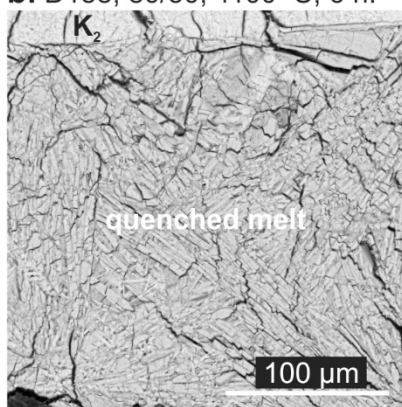
Samples containing potassium carbonate are highly hygroscopic. After decompression, the graphite capsules with the samples were immediately filled with epoxy. Then cassettes were cut using a low-speed diamond saw to get a nearly axial, vertical cross-sections of samples. The obtained specimens were mounted in a plexiglass holder and again filled with epoxy. During polishing, the samples were always under oil. The course of polishing can be controlled only under a binocular microscope, since the surface of the sample is covered with oil. We should not try to check the surface roughness under reflected light. It is likely that the sample will be damaged by atmospheric humidity. Note that, at humidity, over 40 % the samples cannot be left in the air more than 1 min. Examples of BSE images of well-polished samples and the same samples damaged by atmospheric humidity are shown in Figure S1.

Run No.; $\text{K}_2\text{#}/\text{Ca#}$, mol%; temperature; run duration.

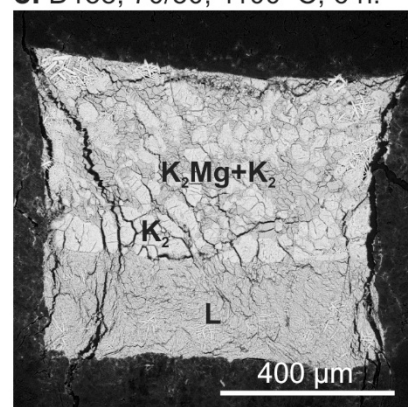
a. D158; 80/50; 1100 °C; 6 h.



b. D158; 80/50; 1100 °C; 6 h.

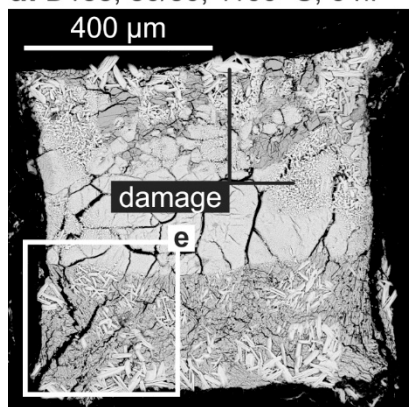


c. D158; 70/50; 1100 °C; 6 h.

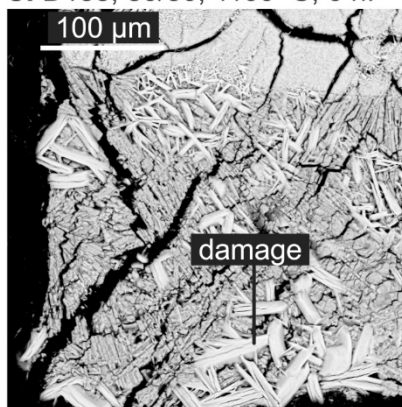


samples damaged by atmospheric humidity

d. D158; 80/50; 1100 °C; 6 h.



e. D158; 80/50; 1100 °C; 6 h.



f. D158; 70/50; 1100 °C; 6 h.

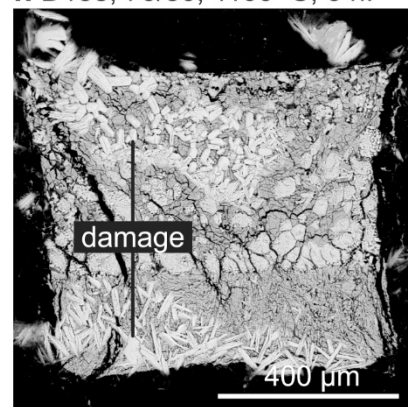


Figure S1. BSE images illustrating the damage of K_2CO_3 -bearing samples by atmospheric humidity. (a–c) Successful polishing. (d–f) The same samples damaged by water from the air. Absorbed water saturates with K_2CO_3 . Placing the sample in a vacuum for carbon coating results in water evaporation and precipitation of needle crystals of K-phase, presumably KHCO_3 , on the sample surface. This prevents the chemical analysis of the obtained phases.

At high humidity samples damage can be fatal. Small samples turn into drops of water. Even if humidity is low the samples can be damaged by evaporation from own hands. Therefore, it is better to use rubber gloves during sample study by Raman spectroscopy.