



Supplement of

Effect of chemically induced fracturing on the ice nucleation activity of alkali feldspar

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Fig. S1. Microcline specimen used for preparation of FS06-010 sample. The cleavage planes were initially identified from the specimen appearance and angular relationships between the free growing planes and confirmed by back-scattered electron diffractometry (BSED).



Fig. S2. Polarization microscope image of microcline feldspar (sample FS06-010). The thin section (~20 μ m) was prepared parallel to the (010) plane. The micro-perthite structure of intergrowth lamellae is clearly visible. The interference colours are enhanced by the quartz wedge inserted into the optical path of the microscope.

| Components | orthoclase | microcline | alhite |
|-------------------|--------------|--------------|--------------|
| Lattice constants | onnoclase | | aisite |
| a [Å] | 8.58499(28) | 8.59735(55) | 8.14127(51) |
| b [Å] | 12.98310(27) | 12.97389(87) | 12.7979(12) |
| c [Å] | 7.20553(16) | 7.21518(54) | 7.15525(60) |
| α [°] | 90 | 90.2851(84) | 94.251(12) |
| β[°] | 116.0177(22) | 116.0222(65) | 116.5891(74) |
| ۷ [°] | 90 | 88.9051(72) | 87.8129(94) |
| Volume [ų] | 721.736(35) | 723.066(95 | 664.82(10) |
| Fraction [%] | 41.08 | 39.51 | 19.40 |

 Table T1. Lattice constants and fractional composition of FS06 sample determined with XRD (Panalytical, Cu K-alpha 1&2).



Fig. S3. Back-scattered electron (BSE) images of A: cation exchanged feldspar (sample F08-01), feldspar fragment bounded by (010) cleavage planes, with cracks extending approximately perpendicular to (010), cloud shaped light grey areas in the central portions are relic domains with relatively K-rich compositions; B: detail of the K-rich domain; C: overview image of grain mount of cation exchanged and subsequently vacuum annealed sample FS08-64c; D: detail of sample shown in C with well visible parallel cracks and relic cloud shaped K-rich domains in the central portion. E: overview of cation exchanged and subsequently salt annealed sample FS08-64o with well visible K-rich zones along previously formed cracks appearing bright grey in BSE contrast; F: detailed view of sample FS08-64o.



Fig. S4. Orientation of the Murchison plane with respect to crystalline structure of feldspar. A: Schematic sketch of the crystal coordinate system and of feldspar single crystal bounded by (100), (010) and (001) planes; the grey plane represents a crack with orientation close to the Murchison plane. B: Crystal coordinate system viewed along the crystallographic b-axis so that the angle β and the angles between the (100) plane and the chemically induced cracks as well as the Murchison plane appear in true size. Only the traces of the (100) plane, the Murchison plane and the cracks are visible in this projection. The chemically induced cracks are uneven. As a consequence, the have somewhat variable orientation and enclose an angle of 8° to 18° with the (100) plane. The Murchison plane encloses an angle of 8° ($\overline{8}01$) to 11° ($\overline{6}01$) with the (100) plane. C: A unit cell of K-feldspar showing oxygen tetrahedra centred on Al⁺ and Si⁺ atoms, the K⁺ framework cations, and the Murchison plane with orientation ($\overline{6}01$).