

Hydrous modified olivine and humite group minerals as potential hosts for water in the upper mantle

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A possible structure for hydrous modified olivine has been obtained by the subtraction of Mg_3SiO_5 from forsterite by crystallographic shear along a direction parallel to the [010] direction of olivine. Although the structure contains some building blocks derived from olivine, it contains Si_2O_7 group and the term 'hydrous modified olivine' is therefore proposed and used in this study. Instead of using unit blocks of Mg_2SiO_4 and $\text{Mg}(\text{OH})_2$, the crystal structures of humite group minerals can be formed by the similar operation from forsterite as a parent structure. In this study it is proposed that the crystal structure intermediate between hydrous modified olivine and humite group mineral can be created by moving part of Si to the brucite layer in the crystal structure of humite group minerals.