

LETTER

Magnesium *K*-edge EXAFS study of bond-length behavior in synthetic pyrope-grossular garnet solid solutions

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ABSTRACT

Direct structural characterization of the changes in the local environment of Mg occurring in the garnet structure as a function of the Ca content are determined by Mg *K*-edge X-ray absorption fine structure on synthetic samples along the pyrope-grossular join. With increasing Ca content, the short Mg-O2 distance of the dodecahedron slightly decreases, while the long Mg-O4 distance tends to increase, so that the dodecahedron is more distorted in grossular-rich garnets than in end-member pyrope. This quantitative direct description of the changes in the local environment of Mg in the pyrope-grossular solid solution confirms and better defines previous experimental and recent computational results.

Keywords: Pyrope-grossular garnets, EXAFS, magnesium, local environment