



**FIGURE 1.** Crystal structure of the  $\text{CaAl}_4\text{Si}_2\text{O}_{11}$  (CAS) phase (**a**), and the spinel-like sheet of edge-sharing octahedra in the structure (Gautron et al. 1999). The two types of octahedral sites are labeled as M1 and M2, and the face-sharing tetrahedral site is labeled as T. Large spheres represent Ca atoms, small spheres represent oxygen atoms, and the others are Si and/or Al atoms. Boxes delineate the unit-cell dimension. Drawings have been produced with VESTA (Momma and Izumi 2008).