

Does antigorite really contain 4- and 8-membered rings of tetrahedra?

ISTVÁN DÓDONY,^{1,*} MIHÁLY PÓSFAL,² AND PETER R. BUSECK¹

¹Departments of Geological Sciences and Chemistry/Biochemistry, Arizona State University, Tempe, Arizona 85287, U.S.A.

²Department of Earth and Environmental Sciences, Pannon University, Veszprém, POB 158, H-8200 Hungary

ABSTRACT

Recent studies of the structure of antigorite by Capitani and Mellini (2004, 2005) and by us (Dódonny et al. 2002; Dódonny and Buseck 2004a) produced contradictory results. The main point of contention is whether 4- and 8-membered rings of tetrahedra occur at the positions where the tetrahedra in the tetrahedral sheets reverse their orientation. We analyzed electron diffraction patterns and transmission electron microscopy images in the paper of Capitani and Mellini (2005) and found no evidence for 4- and 8-membered rings of tetrahedra. On the contrary, we show that their TEM data confirm our antigorite model (Dódonny et al. 2002) for the $m = 16$ structure. The significance of this debate goes beyond the subtleties of the structure of antigorite and highlights ambiguities in interpretation of HRTEM images as well as problems that can arise during image processing.

Keywords: Serpentine, antigorite, crystal structure, HRTEM, electron diffraction, image processing