

LETTER

Morphological characteristics of ordered kaolinite: Investigation using electron back-scattered diffraction

JUN KAMEDA,^{1,*} AKIHIKO YAMAGISHI,^{1,2} AND TOSHIHIRO KOGURE^{1,2}

¹Department of Earth and Planetary Science, Graduate School of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-0033, Japan

²Core Research for Evolutional Science and Technology (CREST), Japan Science and Technology Agency, 4-1-8 Honcho, Kawaguchi, Saitama, 332-0012, Japan

ABSTRACT

Morphology of kaolinite crystals with high-crystallinity (Keokuk, Iowa) has been investigated by electron back-scattered diffraction (EBSD) and high-resolution scanning electron microscopy (SEM). EBSD patterns from the specimen generally correspond to those expected from ordered kaolinite. Elongated hexagonal crystals always show the *a*-axis parallel to the elongated direction. The side-facets of these crystals are in parallel to the *c*-axis, which is inclined by about 15° from the normal to the basal plane. The Miller indices of the side-facets are exactly $\pm(110)$, $\pm(1\bar{1}0)$, and $\pm(010)$. A facet indexed as $\pm(1\bar{3}0)$ is developed in some crystals. These morphological characteristics must be reflected in the ordered stacking sequences (the position of the octahedral vacancy site and the direction of the interlayer shift) of the Keokuk kaolinite. Inversely, the crystallinity of individual kaolinite grains may be evaluated from their morphology in a SEM. The feasibility to discriminate the enantiomers in kaolinite using EBSD is also described.