

LETTER

Electron backscatter diffraction (EBSD) analyses of phyllosilicates in petrographic thin sections

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ABSTRACT

Applications of electron backscatter diffraction (EBSD) to obtain crystallographic information of minerals in petrographic thin sections in mineralogy and petrology are increasing. However, platy phyllosilicates that mostly appear with their silicate layers terminated by the surface in the thin sections generally do not show sharp EBSD patterns in spite of gentle mechanical polishing. TEM examination indicated that this is due to crystal bending of phyllosilicates from the surface to a few micrometers in depth, caused by the polishing process. Ion beam etching commonly used to prepare TEM specimens was found to be applicable to remove the surface region with crystal bending. As a result, clear and sharp EBSD patterns were acquired from the phyllosilicates (micas, chlorite, etc.) in petrographic thin sections, by which their crystal orientations and polytypes were unambiguously determined.

Keywords: EBSD, phyllosilicates, petrographic thin section, surface damage, ion milling, polytype, chlorite, mica