Polytype Diversity of the Hydrotalcite-Like Minerals I. Possible Polytypes and their Diffraction Features

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Abstract: All possible polytypes of hydrotalcite-like minerals with a periodicity along the *c* axis of one-, two- and three-layers, as well as the simplest six-layer polytypes, were derived on the basis of the concept of closely packed brucite-like layers. Multilayer structures were found to be possible in several polytype modifications—three two-layer, nine three-layer, and a set of six-layer polytypes. The neighboring layers may be stacked in two different ways, building two kinds of interlayers: P-type where OH sheets lie one above another forming prisms and O-type where OH groups forms octahedra. Based on the kind of interlayer space, all polytypes may be separated into three groups: homogeneous interlayers of O-, or P-type, and alternating interlayers of both types. For the members of the first two groups, powder XRD patterns were calculated and criteria for distinguishing polytypes with the same number of layers per unit cell are suggested.

Key Words: Hydrotalcite-like group • Polytype • X-ray diffraction criteria

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