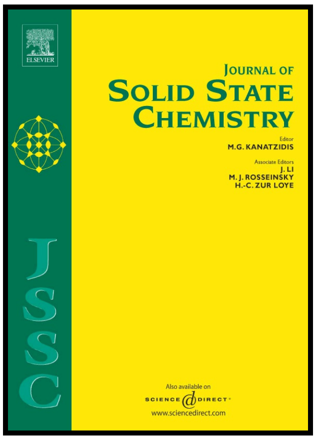

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ABSTRACT

The bayerite-derived layered double hydroxide of Li and Al crystallizes in a hexagonal structure (space group $P\bar{3}1m$) on temperature induced dehydration. The metal hydroxide layers are stacked one above another [stacking vector (0, 0, 1)] in this crystal and the nitrate ion is intercalated with its molecular plane parallel to the metal hydroxide layer. On hydration, (i) there is an expansion in the basal spacing, and (ii) a translation of successive metal hydroxide layers by (1/3, 0, 1) relative to one another. Additionally numerous weak reflections emerge in the powder X-ray diffraction pattern possibly signifying a massive change in the packing of atoms in the interlayer. Partial structure refinement using only the major Bragg reflections suggests that the crystal adopts a structure of monoclinic symmetry (space group *C*2/*m*) with the nitrate ion oriented with its molecular plane perpendicular to the metal hydroxide layer. The complete pattern could be indexed to a cell of orthorhombic symmetry (space group *P*222) but the structure could not be refined for want of a structure model. The absence of a rational relationship between the cell parameters of the orthorhombic and monoclinic cells suggests that the hydrated phase crystallizes in either an incommensurate structure or in an entirely different crystal structure.