$Mg_{0.7}Zn_{0.3}Ti_{0.5}Fe_{2.15}Al_{7.3}O_{15}[OH]$	*hP*54	(186) $P6_3mc$ – $c^6b^6a^3$

$Mg_{1.44}Zn_{0.6}Fe_{4.28}Al_{14.61}Ti(Ga,Mn,Na)_{0.11}O_{30}(OH)_2$ [1], högbomite-8H
Structural features: Close-packed (O,OH) layers in hc_3 stacking; Al, (Al,Fe) and (Fe,Ti) in octahedral, (Fe,Mg,Zn,Al) in tetrahedral voids. Infinite slabs of edge-linked AlO_6 and $Al(O_5[OH])$ octahedra share atoms with $(Al,Fe)O_6$ and $(Fe,Ti)O_6$ octahedra and $(Fe,Mg,Zn,Al)O_4$ tetrahedra to form a 3D-framework with spinel-type slabs.

Gatehouse B.M., Grey L.E. (1982) [1]
$Al_{7.20}Fe_{2.09}HMg_{0.63}O_{16}Ti_{0.50}Zn_{0.29}$
$a = 0.5734$, $c = 1.8389$ nm, $c/a = 3.207$, $V = 0.5236$ nm^3, $Z = 2$

site	Wyck.	sym.	*x*	*y*	*z*	occ.	atomic environment
O1	6*c*	.*m*.	0.1538	0.8462	0.3865		tetrahedron Fe_2Al_2
O2	6*c*	.*m*.	0.1874	0.8125	0.1368		tetrahedron Al_3Fe
O3	6*c*	.*m*.	0.4801	0.5199	0.002		tetrahedron Al_3Fe
M4	6*c*	.*m*.	0.5019	0.498	0.2008		octahedron O_6
O5	6*c*	.*m*.	0.8311	0.1689	0.2536		non-coplanar triangle $FeAl_2$
Al6	6*c*	.*m*.	0.8359	0.164	0.4453		octahedron $O_5(OH)$
Al7	2*b*	3*m*.	$^1/_3$	$^2/_3$	0.0712		octahedron O_6
O8	2*b*	3*m*.	$^1/_3$	$^2/_3$	0.2535		tetrahedron $FeAl_3$
M9	2*b*	3*m*.	$^1/_3$	$^2/_3$	0.3555	0.767	tetrahedron O_4
M10	2*b*	3*m*.	$^1/_3$	$^2/_3$	0.5409		tetrahedron O_4
O11	2*b*	3*m*.	$^1/_3$	$^2/_3$	0.6478		tetrahedron Al_3Fe
(OH)12	2*b*	3*m*.	$^1/_3$	$^2/_3$	0.8902		non-coplanar triangle Al_3
O13	2*a*	3*m*.	0	0	0.0		tetrahedron Al_3Fe
M14	2*a*	3*m*.	0	0	0.1085	0.951	tetrahedron O_4
M15	2*a*	3*m*.	0	0	0.3016		octahedron O_6

M4 = 0.93Al + 0.07Fe; M9 = 0.40Fe + 0.35Al + 0.25Mg; M10 = 0.60Fe + 0.20Mg + 0.15Zn + 0.05Al; M14 = 0.50Fe + 0.25Mg + 0.15Zn + 0.10Al; M15 = 0.50Fe + 0.50Ti
Transformation from published data: origin shift 0 0 0.9974
Experimental: single crystal, diffractometer, X-rays, wR = 0.031

Remarks: Natural specimen from Strangways Range, Central Australia. Composition $Al_{14.61}(Fe^{2+})_{2.84}(Fe^{3+})_{1.44}Mg_{1.40}Ti_{1.00}Zn_{0.60}Ga_{0.02}Mn_{0.03}Na_{0.06}O_{30}(OH)_2$ from electron microprobe analysis. Refinement of the occupancies of sites M10 and M15 showed no significant deviation from unity. Hydrogen atoms are not taken into consideration for Pearson symbol, Wyckoff sequence and atomic environments.

References: [1] Gatehouse B.M., Grey L.E. (1982), Am. Mineral. 67, 373-380.