Supporting Information

Table S1. Selected crystal data and structure refinement parameters for $Mg_4Ta_2O_9$.

Empirical formula	$Mg_4Ta_2O_9$
Formula weight	603.14
Temperature	292(2) K
Radiation, wavelength	Mo-Kα, 0.71073 Å
Crystal system	Trigonal
Space group	P $\bar{3}$c1 (No.165)
Unit cell dimensions	a = b = 5.1626(10) Å
	c = 14.035(4) Å
α, β, γ	90º, 90º, 120º
Unit cell volume, Z	323.94(15) Å^3, 2
Density (calc.)	6.183 g/cm^3
Goodness-of-fit on F^2	1.599
Final R indices [a] [I>2$\sigma_{(I)}$]	$R_1 = 0.0117$ wR$_2 = 0.0228$
Final R indices [a] [all data]	$R_1 = 0.0188$ wR$_2 = 0.0238$

[a] $R_1 = \sum ||F_o| - |F_c||/\sum |F_o|$; wR$_2 = [\sum [w(F_o^2 - F_c^2)^2]/\sum [w(F_o^2)^2]]^{1/2}$, and w $= 1/[\sigma^2 F_o^2 + (A \cdot P)^2 + B \cdot P]$, $P = (F_o^2 + 2F_c^2)/3$; A and B are weight coefficients.