		x	*y*	*z*	Fraction	U_{iso}
Ba(1)	*3a*	0	0	0	1	0.0167
Ba(2)	*6c*	0	0	0.1449(1)	1	0.0075
Ba(3)	*6c*	0	0	0.2297 (1)	1	0.0037
Ba(4)	*6c*	0	0	0.38726(9)	1	0.0058
Mn(1)	*6c*	0	0	0.0758(1)	1	0.0011
Mn(2)	*6c*	0	0	0.4505(1)	1	0.0049
Mn(3)	*3b*	0	0	0.5	1	0.0033
Cr/Mn(4)	*6c*	0	0	0.6984(1)	0.93(1)/0.07(1)	0.0084
O(1)	*18h*	0.1744(2)	0.8255(2)	0.09663(5)	1	0.0077
O(2)	*18h*	0.1477(2)	0.8522(2)	0.47630(4)	1	0.0049
O(3)	*18h*	0.4952(3)	0.5047(3)	0.37778(4)	1	0.0136
O(4)	*6c*	0	0	0.3340(1)	1	0.0429
Space group = R-3m, *a* = 5.7401(1) Å, *c* = 50.597(1) Å volume = 1443.08(7)Å^3						

Table S1: Structural details of $Ba_7Mn_5Cr_2O_{20}$

Cation	Anion	bond length (Å)	multiplicity
Mn(1)	O(1)	2.030(3)	3
	O(3)	2.328(4)	3
Mn(2)	O(1)	1.891(3)	3
	O(2)	1.965(4)	3
Mn(3)	O(2)	1.89(1)	6
Cr/Mn(4)	O(3)	1.734(2)	3
	O(4)	1.639(7)	1
Ba(1)	O(3)	2.822(2)	6
	O(4)	3.314(6)	6
Ba(2)	O(1)	2.996(5)	3
	O(2)	2.878(1)	6
	O(2)	2.949(4)	3
Ba(3)	O(1)	2.893(1)	6
	O(2)	2.714(4)	3
	O(3)	3.400(5)	3
Ba(4)	O(1)	2.677(4)	3
	O(3)	2.911(1)	6
	O(4)	2.695(7)	1

Table S2: Selected bond lengths from $Ba_7Mn_5Cr_2O_{20}$.