Supplementary Data

Table S1: Comparison between conventional spinel ferrites and HEF. (Used for preparing the heatmap correlation, i.e., Fig. 5)

* For studies where the experimental inversion degree was not reported, a value of 0.67 was assumed to represent a statistically random cation distribution. Otherwise, the experimentally reported inversion values were used.
*The ionic radius mismatch was obtained by calculating the weighted average of the mismatches at the tetrahedral and octahedral sites. The specific site occupancy for these calculations was derived directly from the inversion degree.

Sample ID	ΔS_{config} (R)	Cation Mismatch (σ_r)	Inversion Degree (λ)	Lattice Parameter (Å)	Calcination Temp (°C)	Ms (emu/g)	Hc (Oe)	Ref.
$(CoCrFeMnNi)_3O_4$	1.61	0.106	0.67	8.254	850	15.98	58.91	[1]
$(FeCoCrMnZn)_3O_4$	1.61	0.106	0.67	8.399	900	-		[2]
$Mg_{0.2}Mn_{0.2}Fe_{0.2}Co_{0.2}Ni_{0.2})Fe_2O_4$	0.949	0.0835	0.67	8.376	1150	56.1	74.14	[3]
$(Mg_{0.2}Fe_{0.2}Co_{0.2}Ni_{0.2}Cu_{0.2})Fe_2O_4$	0.949	0.058	0.67	8.372	1150	44.26	204.52	[3]
$(Mg_{0.2}Fe_{0.2}Co_{0.2}Ni_{0.2}Zn_{0.2})Fe_2O_4$	0.949	0.0617	0.67	8.381	1150	22.66	48.37	[3]
$(CoFeMnNiCr)_3O_4$	1.61	0.1069	0.67	8.377	800-1100	-	-	[4]
$(CoCrFeMnNi)_3O_4$	1.61	0.1069	0.67	8.346	950	4.38	79.9	[5]
$(CoCrFeNiMn)_3O_4$	1.61	0.1069	0.67	8.35	1000	15.64	74.23	[6]
$(Mn_{0.2}Fe_{0.2}Co_{0.2}Ni_{0.2}Zr_{0.2})_3O_4$	1.61	0.1019	0.67	8.28	500	11.7	108	[7]
$(Cr_{1/5}Mn_{1/5}Fe_{1/5}Co_{1/5}Ni_{1/5})_3O_4$	1.61	0.1069	0.67	8.321	900	9.6	402	[8]
$(Cr_{1/5}Mn_{1/5}Fe_{1/5}Co_{1/5}Zn_{1/5})_3O_4$	1.61	0.1068	0.67	8.371	900	-	13690	[8]
$(Cr_{1/5}Mn_{1/5}Fe_{1/5}Ni_{1/5}Zn_{1/5})_3O_4$	1.61	0.1074	0.67	8.325	900	0.7	3180	[8]
$(Mg_{0.2}Ni_{0.2}Fe_{0.2}Co_{0.2}Cu_{0.2})Fe_2O_4$	0.949	0.058	0.67	8.36	670	-	-	[9]
$(Mn_{0.2}Co_{0.2}Ni_{0.2}Cu_{0.2}Fe_{0.2})Fe_2O_4$	0.9496	0.0824	0.78	8.38	900	63	56	[10]
$(Mn_{0.2}Co_{0.2}Ni_{0.2}Cu_{0.2}Mg_{0.2})Fe_2O_4$	1.173	0.0832	0.7	8.391	900	57	20	[10]
$Ni_{0.50}Zn_{0.50}Fe_2O_4$	0.8676	0.0633	0.67	8.413	-	45	3.77	[11]
$CuFe_2O_4$	0.6365	0.063995	0.67	8.348	700	12.42	484.02	[12]

$MnFe_2O_4$	0.6365	0.13113	0.67	8.505	1100	71.19	6.5	[13]
$MgFe_2O_4$	0.6365	0.059498	0.67	8.3691	650	0.39131	418.51	[14]
$Mg_{0.4}Cu_{0.6}Fe_2O_4$	0.8609	0.062306	0.67	8.2584	650	0.84277	343.3	[14]
$CuFe_2O_4$	0.6365	0.063995	0.67	8.3489	650	1.2431	503.69	[14]
$Ni_{0.5}Zn_{0.5}Fe_2O_4$	0.8676	0.0633	0.67	8.388	1200	80.07	0.03	[15]

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