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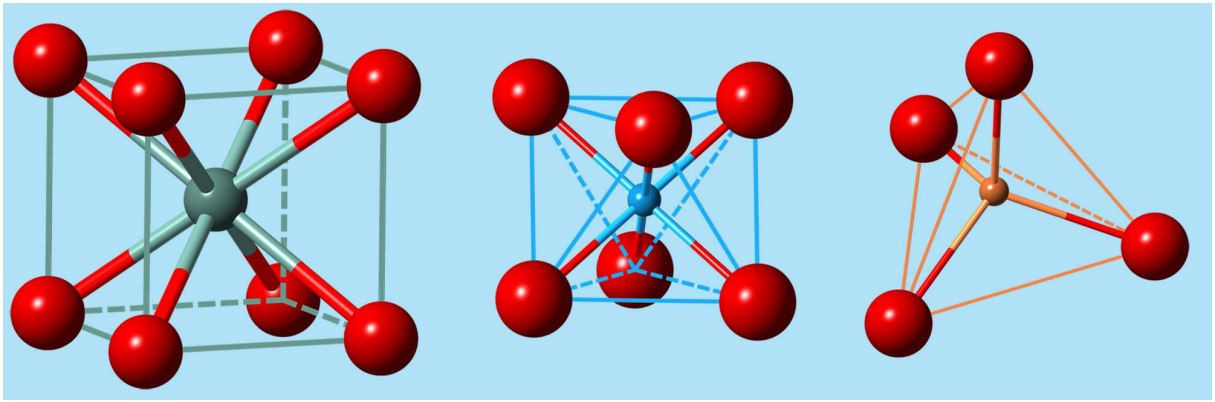

Figure S1: Geometrical relationships used to express the Tolerance Factor

Table S1: Tolerance Factor of End-Member Garnets

ID Num.	Formula	Ref.	τ
80352390	$(Y)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.836
80352590	$(Pr)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.751

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Continuation of Table S1

Num.	Formula	Ref.	τ
80352600	$(Nd)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.765
80352620	$(Sm)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.790
80352630	$(Eu)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.800
80352640	$(Gd)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.810
80352650	$(Tb)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.820
80352660	$(Dy)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.830
80352670	$(Ho)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.839
80352680	$(Er)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.847
80352690	$(Tm)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.854
80352700	$(Yb)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.861
80352710	$(Lu)_3\{Te\}_2[Li]_3 < O >_{12}$	1	0.866
80374590	$(Pr)_3\{W\}_2[Li]_3 < O >_{12}$	1	0.809
80374600	$(Nd)_3\{W\}_2[Li]_3 < O >_{12}$	1	0.823
81313390	$(Y)_3\{Al\}_2[Al]_3 < O >_{12}$	2–4	0.893
81313630	$(Eu)_3\{Al\}_2[Al]_3 < O >_{12}$	5	0.851
81313640	$(Gd)_3\{Al\}_2[Al]_3 < O >_{12}$	3,6	0.863
81313650	$(Tb)_3\{Al\}_2[Al]_3 < O >_{12}$	7,8	0.874
81313660	$(Dy)_3\{Al\}_2[Al]_3 < O >_{12}$	9	0.886
81313670	$(Ho)_3\{Al\}_2[Al]_3 < O >_{12}$	9	0.896
81313680	$(Er)_3\{Al\}_2[Al]_3 < O >_{12}$	10–12	0.905
81313690	$(Tm)_3\{Al\}_2[Al]_3 < O >_{12}$	13	0.914
81313700	$(Yb)_3\{Al\}_2[Al]_3 < O >_{12}$	3,11,12	0.921
81313710	$(Lu)_3\{Al\}_2[Al]_3 < O >_{12}$	3,14	0.928
81321390	$(Y)_3\{Sc\}_2[Al]_3 < O >_{12}$	15	1.186

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Continuation of Table S1

Num.	Formula	Ref.	τ
81321640	$(Gd)_3\{Sc\}_2[Al]_3 < O >_{12}$	16	1.163
81352110	$(Na)_3\{Te\}_2[Al]_3 < O >_{12}$	1	0.782
81413120	$(Mg)_3\{Al\}_2[Si]_3 < O >_{12}$	17–21	1.073
81413200	$(Ca)_3\{Al\}_2[Si]_3 < O >_{12}$	17,19,22–24	0.863
81413250	$(Mn)_3\{Al\}_2[Si]_3 < O >_{12}$	22,23,25,26	1.016
81413260	$(Fe)_3\{Al\}_2[Si]_3 < O >_{12}$	20,27,28	1.049
81413270	$(Co)_3\{Al\}_2[Si]_3 < O >_{12}$	29–31	1.065
81413380	$(Sr)_3\{Al\}_2[Si]_3 < O >_{12}$	Non-Existence 18,32	0.690
81413480	$(Cd)_3\{Al\}_2[Si]_3 < O >_{12}$	18	0.884
81413560	$(Ba)_3\{Al\}_2[Si]_3 < O >_{12}$	Non-Existence 18,32	0.391
81421200	$(Ca)_3\{Sc\}_2[Si]_3 < O >_{12}$	33,34	1.206
81423200	$(Ca)_3\{V\}_2[Si]_3 < O >_{12}$	35	1.044
81423250	$(Mn)_3\{V\}_2[Si]_3 < O >_{12}$	18	1.174
81423480	$(Cd)_3\{V\}_2[Si]_3 < O >_{12}$	36	1.061
81424120	$(Mg)_3\{Cr\}_2[Si]_3 < O >_{12}$	22	1.189
81424200	$(Ca)_3\{Cr\}_2[Si]_3 < O >_{12}$	37–39	1.003
81424250	$(Mn)_3\{Cr\}_2[Si]_3 < O >_{12}$	18,22	1.137
81424260	$(Fe)_3\{Cr\}_2[Si]_3 < O >_{12}$	22	1.167
81425200	$(Ca)_3\{Mn\}_2[Si]_3 < O >_{12}$	18	0.943
81425250	$(Mn)_3\{Mn\}_2[Si]_3 < O >_{12}$	40	1.085
81426120	$(Mg)_3\{Fe\}_2[Si]_3 < O >_{12}$	41	1.096
81426200	$(Ca)_3\{Fe\}_2[Si]_3 < O >_{12}$	18,19,41	0.890
81426250	$(Mn)_3\{Fe\}_2[Si]_3 < O >_{12}$	18,22	1.039
81426260	$(Fe)_3\{Fe\}_2[Si]_3 < O >_{12}$	22	1.072

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Continuation of Table S1

Num.	Formula	Ref.	τ
81431200	$(Ca)_3\{Ga\}_2[Si]_3 < O >_{12}$	18	1.011
81439200	$(Ca)_3\{Y\}_2[Si]_3 < O >_{12}$	Orthorhombic 42,43	1.423
81449200	$(Ca)_3\{In\}_2[Si]_3 < O >_{12}$	18,44	1.285
82321110	$(Na)_3\{Sc\}_2[V]_3 < O >_{12}$	45,46	1.095
82626390	$(Y)_3\{Fe\}_2[Fe]_3 < O >_{12}$	3,47–50	0.867
82626590	$(Pr)_3\{Fe\}_2[Fe]_3 < O >_{12}$	51,52	0.775
82626600	$(Nd)_3\{Fe\}_2[Fe]_3 < O >_{12}$	52,53	0.791
82626620	$(Sm)_3\{Fe\}_2[Fe]_3 < O >_{12}$	3,54	0.817
82626630	$(Eu)_3\{Fe\}_2[Fe]_3 < O >_{12}$	54	0.828
82626640	$(Gd)_3\{Fe\}_2[Fe]_3 < O >_{12}$	54–56	0.839
82626650	$(Tb)_3\{Fe\}_2[Fe]_3 < O >_{12}$	54,57	0.850
82626660	$(Dy)_3\{Fe\}_2[Fe]_3 < O >_{12}$	3	0.860
82626670	$(Ho)_3\{Fe\}_2[Fe]_3 < O >_{12}$	58	0.870
82626680	$(Er)_3\{Fe\}_2[Fe]_3 < O >_{12}$	54	0.878
82626690	$(Tm)_3\{Fe\}_2[Fe]_3 < O >_{12}$	58	0.886
82626700	$(Yb)_3\{Fe\}_2[Fe]_3 < O >_{12}$	3	0.893
82626710	$(Lu)_3\{Fe\}_2[Fe]_3 < O >_{12}$	3	0.899
83121390	$(Y)_3\{Sc\}_2[Ga]_3 < O >_{12}$	59	1.134
83121570	$(La)_3\{Sc\}_2[Ga]_3 < O >_{12}$	59	1.041
83121640	$(Gd)_3\{Sc\}_2[Ga]_3 < O >_{12}$	59–61	1.113
83121710	$(Lu)_3\{Sc\}_2[Ga]_3 < O >_{12}$	59	1.160
83131390	$(Y)_3\{Ga\}_2[Ga]_3 < O >_{12}$	3,48,50	0.974
83131590	$(Pr)_3\{Ga\}_2[Ga]_3 < O >_{12}$	62	0.891
83131600	$(Nd)_3\{Ga\}_2[Ga]_3 < O >_{12}$	63	0.905

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Continuation of Table S1

Num.	Formula	Ref.	τ
83131620	$(Sm)_3\{Ga\}_2[Ga]_3 < O >_{12}$	63,64	0.929
83131630	$(Eu)_3\{Ga\}_2[Ga]_3 < O >_{12}$	62	0.939
83131640	$(Gd)_3\{Ga\}_2[Ga]_3 < O >_{12}$	63,65–67	0.949
83131650	$(Tb)_3\{Ga\}_2[Ga]_3 < O >_{12}$	7,63,68	0.958
83131660	$(Dy)_3\{Ga\}_2[Ga]_3 < O >_{12}$	69	0.968
83131670	$(Ho)_3\{Ga\}_2[Ga]_3 < O >_{12}$	69	0.977
83131680	$(Er)_3\{Ga\}_2[Ga]_3 < O >_{12}$	70	0.984
83131700	$(Yb)_3\{Ga\}_2[Ga]_3 < O >_{12}$	3	0.998
83131710	$(Lu)_3\{Ga\}_2[Ga]_3 < O >_{12}$	3	1.003
83152110	$(Na)_3\{Te\}_2[Ga]_3 < O >_{12}$	1	0.748
83212391	$(Y_{2/3}Mg_{1/3})_3\{Mg\}_2[Ge]_3 < O >_{12}$	71	1.181
83213200	$(Ca)_3\{Al\}_2[Ge]_3 < O >_{12}$	72	0.799
83213250	$(Mn)_3\{Al\}_2[Ge]_3 < O >_{12}$	73	0.941
83213480	$(Cd)_3\{Al\}_2[Ge]_3 < O >_{12}$	44,73	0.819
83221200	$(Ca)_3\{Sc\}_2[Ge]_3 < O >_{12}$	33,44,74	1.117
83221380	$(Sr)_3\{Sc\}_2[Ge]_3 < O >_{12}$	75,76	1.009
83221480	$(Cd)_3\{Sc\}_2[Ge]_3 < O >_{12}$	33,44,73	1.131
83223200	$(Ca)_3\{V\}_2[Ge]_3 < O >_{12}$	77	0.967
83223480	$(Cd)_3\{V\}_2[Ge]_3 < O >_{12}$	77	0.984
83224200	$(Ca)_3\{Cr\}_2[Ge]_3 < O >_{12}$	78	0.929
83224250	$(Mn)_3\{Cr\}_2[Ge]_3 < O >_{12}$	79	1.054
83224480	$(Cd)_3\{Cr\}_2[Ge]_3 < O >_{12}$	73	0.946
83225200	$(Ca)_3\{Mn\}_2[Ge]_3 < O >_{12}$	77	0.874
83226200	$(Ca)_3\{Fe\}_2[Ge]_3 < O >_{12}$	71	0.825

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Continuation of Table S1

Num.	Formula	Ref.	τ
83226250	$(Mn)_3\{Fe\}_2[Ge]_3 < O >_{12}$	80	0.963
83226480	$(Cd)_3\{Fe\}_2[Ge]_3 < O >_{12}$	73	0.844
83231200	$(Ca)_3\{Ga\}_2[Ge]_3 < O >_{12}$	81	0.937
83231250	$(Mn)_3\{Ga\}_2[Ge]_3 < O >_{12}$	72	1.061
83231480	$(Cd)_3\{Ga\}_2[Ge]_3 < O >_{12}$	44,73	0.954
83239120	$(Mg)_3\{Y\}_2[Ge]_3 < O >_{12}$	Not Reported	1.445
83239200	$(Ca)_3\{Y\}_2[Ge]_3 < O >_{12}$	71,75	1.319
83239380	$(Sr)_3\{Y\}_2[Ge]_3 < O >_{12}$	75,82	1.228
83245200	$(Ca)_3\{Rh\}_2[Ge]_3 < O >_{12}$	77	1.004
83249200	$(Ca)_3\{In\}_2[Ge]_3 < O >_{12}$	44	1.191
83249380	$(Sr)_3\{In\}_2[Ge]_3 < O >_{12}$	76	1.090
83249480	$(Cd)_3\{In\}_2[Ge]_3 < O >_{12}$	44	1.204
83266200	$(Ca)_3\{Dy\}_2[Ge]_3 < O >_{12}$	76	1.333
83267200	$(Ca)_3\{Ho\}_2[Ge]_3 < O >_{12}$	76	1.320
83267380	$(Sr)_3\{Ho\}_2[Ge]_3 < O >_{12}$	76	1.230
83268200	$(Ca)_3\{Er\}_2[Ge]_3 < O >_{12}$	76	1.306
83268380	$(Sr)_3\{Er\}_2[Ge]_3 < O >_{12}$	76	1.215
83269200	$(Ca)_3\{Tm\}_2[Ge]_3 < O >_{12}$	76	1.294
83269380	$(Sr)_3\{Tm\}_2[Ge]_3 < O >_{12}$	76	1.201
83270200	$(Ca)_3\{Yb\}_2[Ge]_3 < O >_{12}$	76	1.278
83270380	$(Sr)_3\{Yb\}_2[Ge]_3 < O >_{12}$	76	1.185
83271200	$(Ca)_3\{Lu\}_2[Ge]_3 < O >_{12}$	76	1.270
83271380	$(Sr)_3\{Lu\}_2[Ge]_3 < O >_{12}$	76	1.176
83324110	$(Na)_3\{Cr\}_2[As]_3 < O >_{12}$	83	0.904

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Num.	Formula	Ref.	τ
83326110	$(Na)_3\{Fe\}_2[As]_3 < O >_{12}$	84	0.788
85031200	$(Ca)_3\{Ga\}_2[Sn]_3 < O >_{12}$	76	0.859
90313110	$(Na)_3\{Al\}_2[Li]_3 < F >_{12}$	85	0.636
90321110	$(Na)_3\{Sc\}_2[Li]_3 < F >_{12}$	86	0.956
90322110	$(Na)_3\{Ti\}_2[Li]_3 < F >_{12}$	87	0.852
90323110	$(Na)_3\{V\}_2[Li]_3 < F >_{12}$	87	0.808
90324110	$(Na)_3\{Cr\}_2[Li]_3 < F >_{12}$	87	0.769
90326110	$(Na)_3\{Fe\}_2[Li]_3 < F >_{12}$	87,88	0.662
90327110	$(Na)_3\{Co\}_2[Li]_3 < F >_{12}$	87	0.654
90349110	$(Na)_3\{In\}_2[Li]_3 < F >_{12}$	86	1.028
			End of Table

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Tolerance factors of over 130 different end-member garnets together with references, illustration of geometrical relationships used to express the tolerance factor are included in the supporting information.