

Supplementary Information File

Diffraction Data:

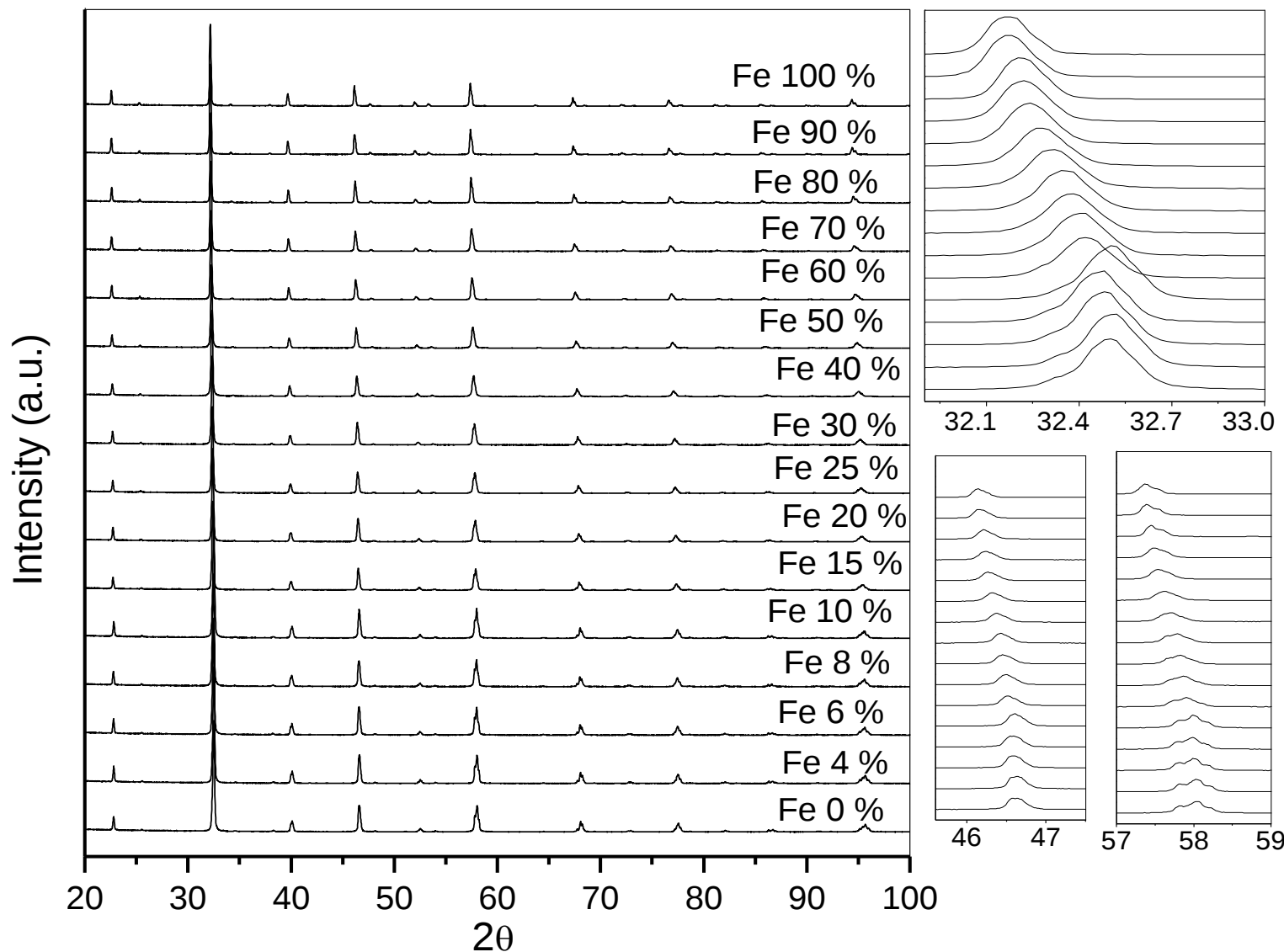


Figure SI 1: X-ray diffraction data for the prepared Fe doped LaGaO_3 samples the. The magnified view of peak corresponding to $2\theta \approx 32.5^\circ$, 46.5° and 58° are shown.

Fe % (X)	Ga/Fe-O ₁ Bond Length	Ga/Fe-O ₂ Bond Length	Ga/Fe-O ₁ Bond Length	Bragg R- factor	RF-factor	χ^2	Angle Ga/Fe-O1-Ga/Fe	Angle Ga/Fe-O2-Ga/Fe
0	1.972(0.0016)	2.005(0.0031)	1.979(.0014)	6.78	7.34	1.53	161.0(0.4)	158.4(0.8)
0.5	1.983(0.0024)	2.0054(0.003)	1.981(0.003)	5.79	8.38	2.13	161.0 (0.6)	157.2(0.5)
1	1.980(0.0012)	2.0057(0.001)	1.984(0.0024)	6.78	9.50	2.35	160.1(0.9)	158.1(0.6)
1.5	1.98 (0.0008)	2.006(0.0006)	1.981(0.0021)	6.34	8.96	2.15	160.9 (0.5)	158.1(0.7)
2	1.987(0.0020)	2.006(0.0001)	1.977(0.002)	3.26	5.03	1.63	161(0.7)	158.3(0.6)
4	1.983(0.0030)	2.00(0.003)	1.983(0.0015)	3.39	4.94	1.58	160.7(0.9)	157.5(0.5)
6	1.984(0.0024)	2.021(0.0017)	1.984(0.0014)	3.45	5.66	1.57	160.9(0.7)	157.2(0.8)
8	1.989(0.0016)	2.020(0.0019)	1.990(0.0015)	3.01	5.64	1.49	161.3(0.5)	155.6(0.9)
10	1.987(0.0025)	1.997(0.0019)	1.987(0.0015)	3.21	4.88	1.56	161.6(0.8)	156.6(0.5)
15	1.986(0.0036)	2.024(0.0014)	1.986(0.0014)	5.63	7.04	2.06	160.4(0.4)	157.2(0.6)
20	1.996(0.0024)	2.031(0.0014)	1.985(0.002)	3.2	4.2	1.34	160.3(0.7))	157.8(0.8)
25	1.994(0.0016)	2.033(0.0017)	1.994(0.0014)	2.92	3.85	1.36	161.1(0.9)	155.7(0.7)
30	2.000(0.0002)	2.035(0.0019)	2.000(0.0015)	3.2	4.19	1.35	161.8(0.4)	154.4(0.4)
40	2.008(0.0024)	2.039(0.0019)	2.014(0.0026)	3	3.8	1.45	162.6(0.5)	151.7(0.6)
50	2.006(0.0002)	2.03(0.002)	2.006(0.0017)	3.29	3.66	1.39	160.5(0.6)	154.1(0.5)
60	2.007(0.0024)	2.038(0.0019)	2.007(0.0015)	3.21	3.54	1.38	159.4(0.7)	154.4(0.9)
70	2.008(0.0024)	2.046(0.0019)	2.008(0.0017)	3.4	3.52	1.38	159.2(0.9)	154.7(0.5)
80	2.004(0.0026)	2.048(0.0019)	2.004(0.0026)	3.76	4.25	1.46	159.3(0.6)	156.1(0.6)
90	2.005(0.0035)	2.044(0.003)	2.005(0.0016)	3.75	4.43	1.4	157.8(0.5)	156.2(0.8)
100	2.003(0.0021)	2.054(0.0019)	2.004(0.002)	8.15	8.41	1.96	157.5(0.4)	156.9(0.6)

Table SI 1: Refined values of bond lengths, bond angles and goodness of fitting parameters for LaGa_{1-x}Fe_xO₃. The figures in the bracket shows the corresponding error bar. The values such as Wyckoff positions lattice parameters etc. are provided in table-1 of the manuscript.