CeO_2 F structure *cF*12 *Fm*-3*m* Z=4 a=5.4097(1) Å [8]			**$Ce_{1-x}Sm_xO_{2-x/2}$** Hybrid (H) model used for Rietveld refinement of samples with x=0.4, 0.5 and 0.6 *cI*96 *Ia*-3 Z=32			**Sm_2O_3** C structure *cI*80 *Ia*-3 Z=16 a=10.929 Å		
Atom	Wyckoff site	Coordinates	Atom	Wyckoff site	Coordinates	Atom	Wyckoff site	Coordinates
Ce	4*a*	0, 0, 0	Ce/Sm1	24*d*	x, 0, 1/4 x = 0.25	Sm1	24*d*	x, 0, 1/4 x = 0.2796
			Ce/Sm	8*a*	0, 0, 0	Sm2	8*a*	0, 0, 0
O	8*c*	1/4, 1/4, 1/4	O1	48*e*	x, y, z x = 0.125 y = 0.375 z = 0.125	O	48*e*	x, y, z x = 0.1011 y = 0.3551 z = 0.1343
			O2	16*c*	x, x, x x = 0.125			

Table S1 – Hybrid (H) structural model compared to the F structure typical of CeO_2 and to the C structure typical of sesquioxides of heavy rare earths; data of Sm_2O_3 are taken from M. Mitric *et al.*, *J. Alloy Compd.* **2009**, *485*, 473-477.

Rietveld refinement plots

In this file all the Rietveld plots obtained after the last refinement cycle are reported. The dotted and the continuous line are the experimental and the calculated diffractogram, respectively; the lower line is the difference curve; the vertical lines indicate the position of the expected peaks.

According to the RE content and to the applied pressure (in GPa), samples are named Sm20_5, Sm30_7, and so on.

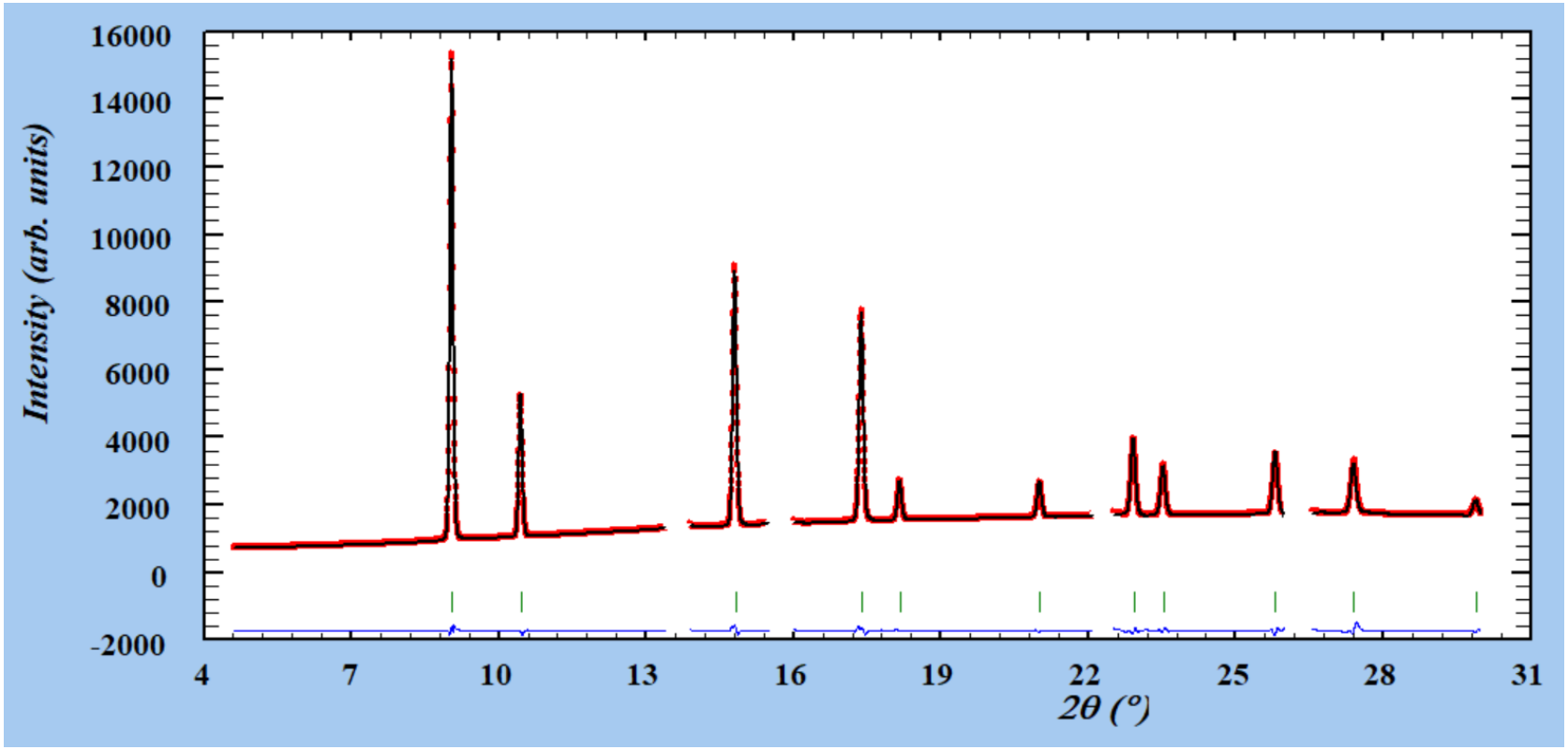

Figure S1 – Rietveld refinement plot for sample Sm20_room pressure. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

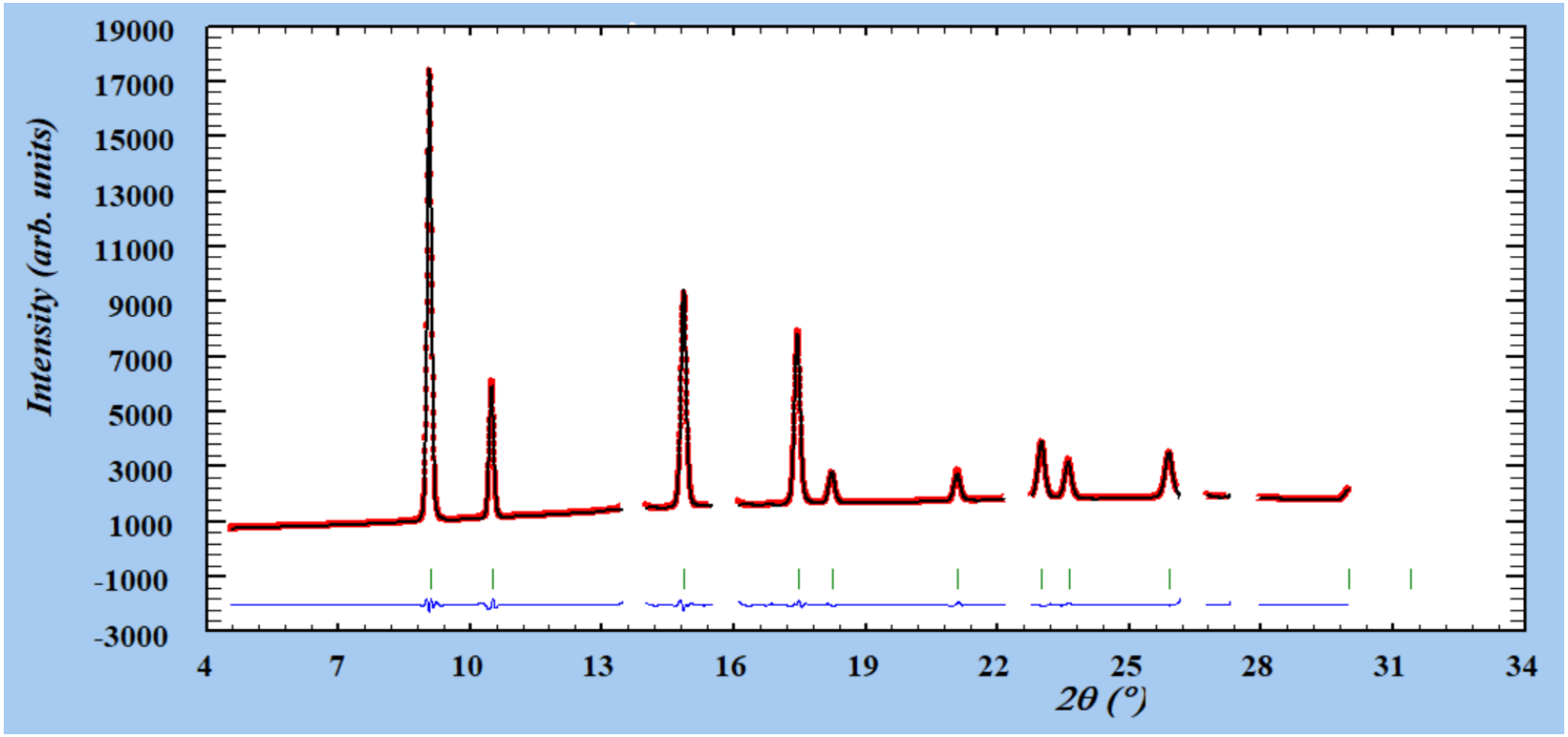

Figure S2 – Rietveld refinement plot for sample Sm20_2.75. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

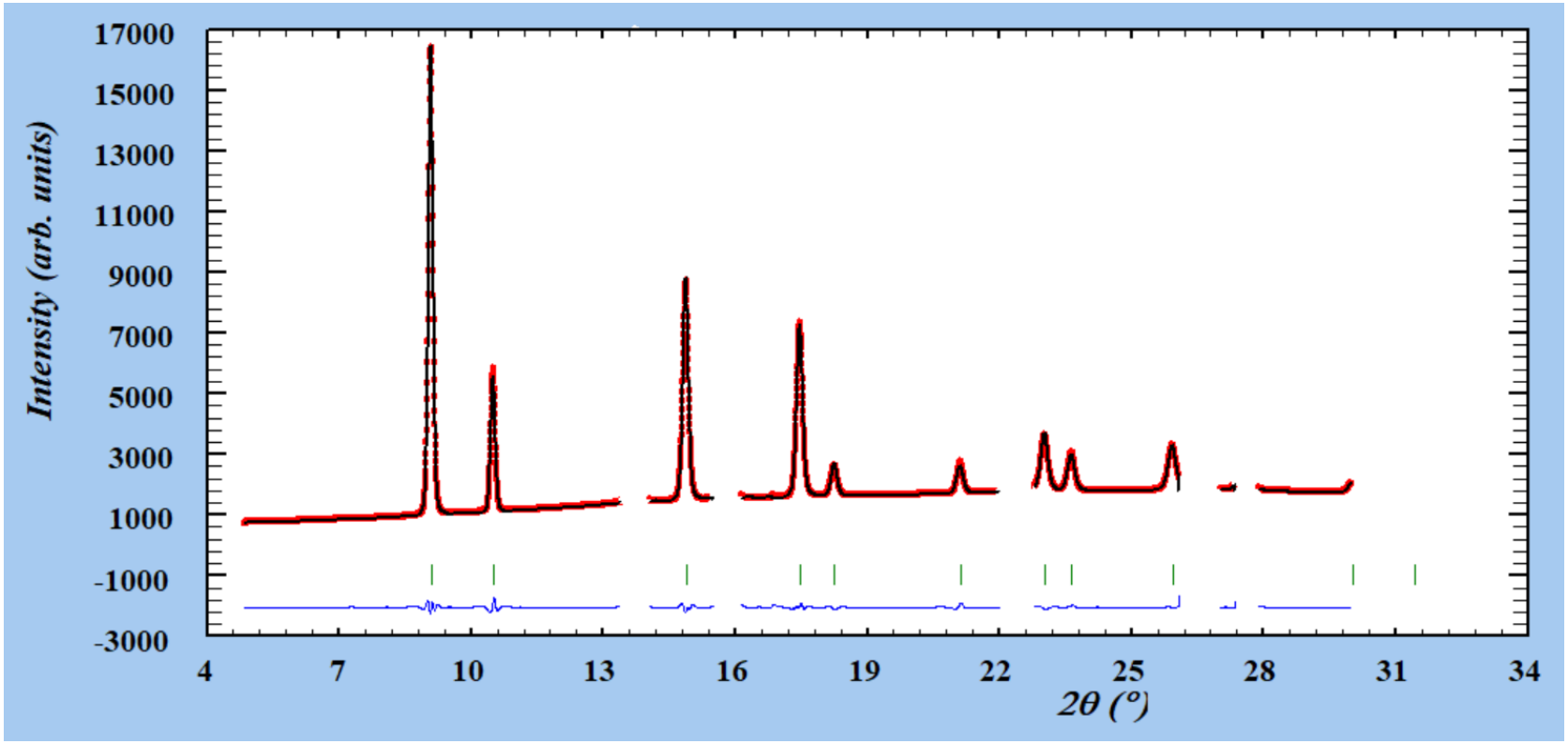

Figure S3 – Rietveld refinement plot for sample Sm20_3.45. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

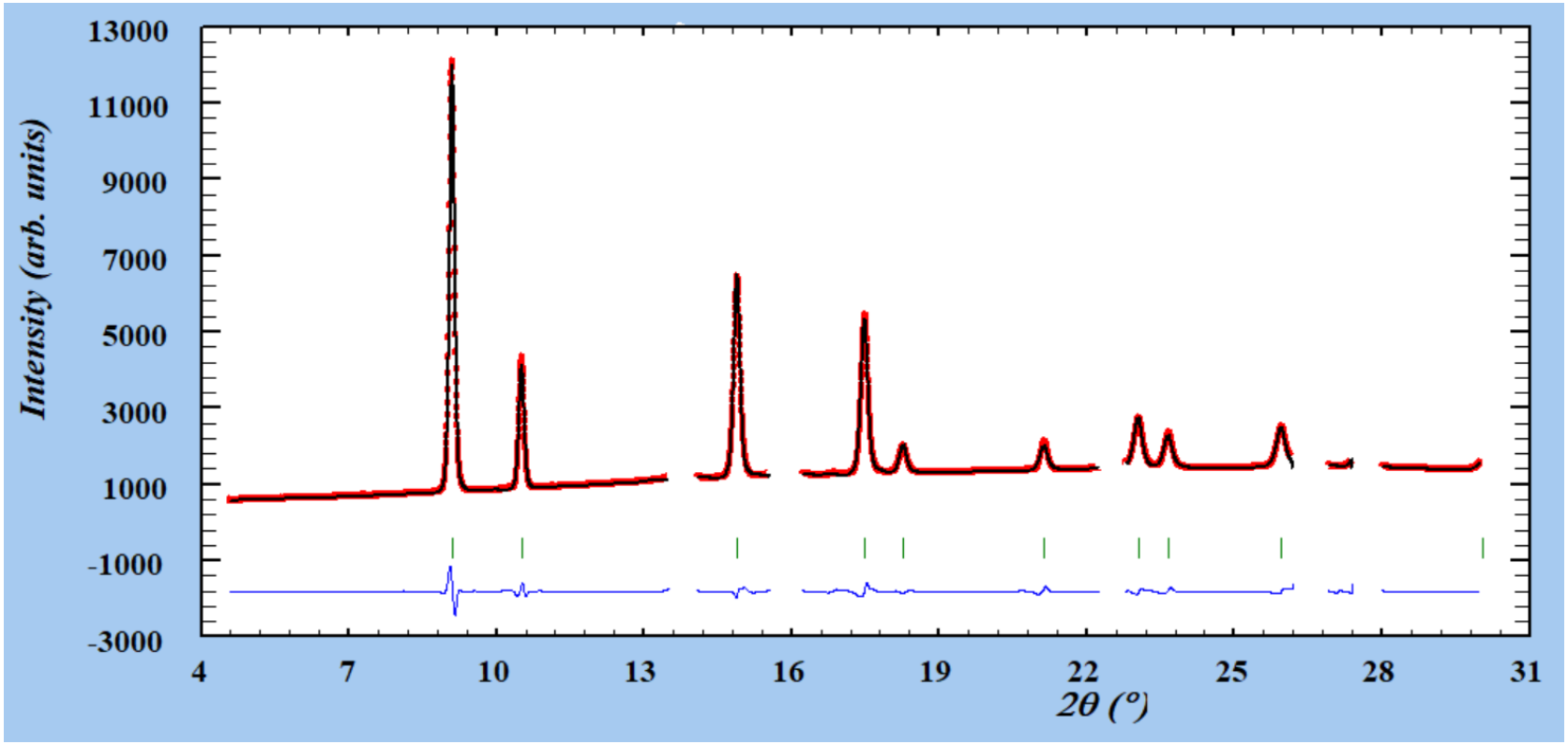

Figure S4 – Rietveld refinement plot for sample Sm20_4.20. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

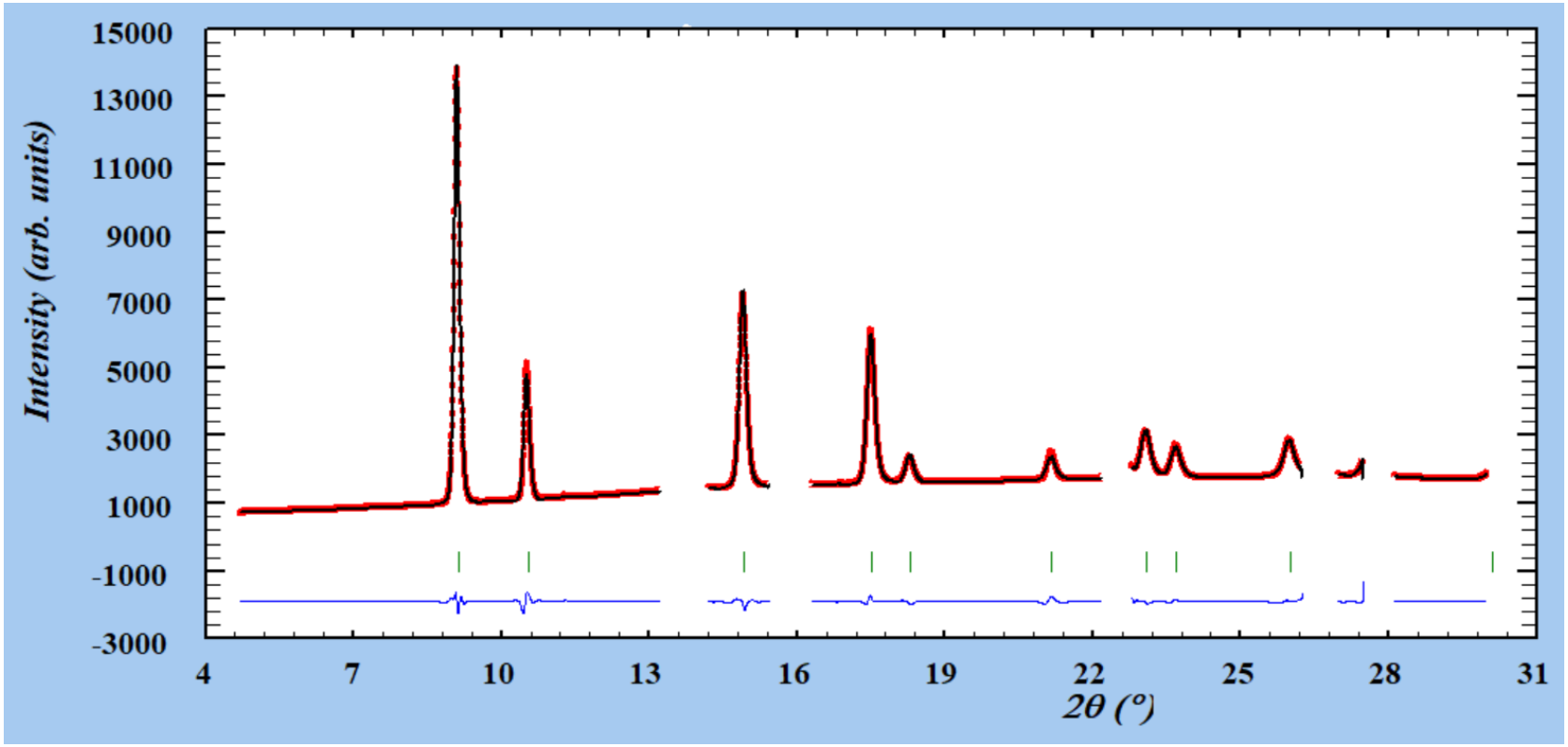

Figure S5 – Rietveld refinement plot for sample Sm20_4.88. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

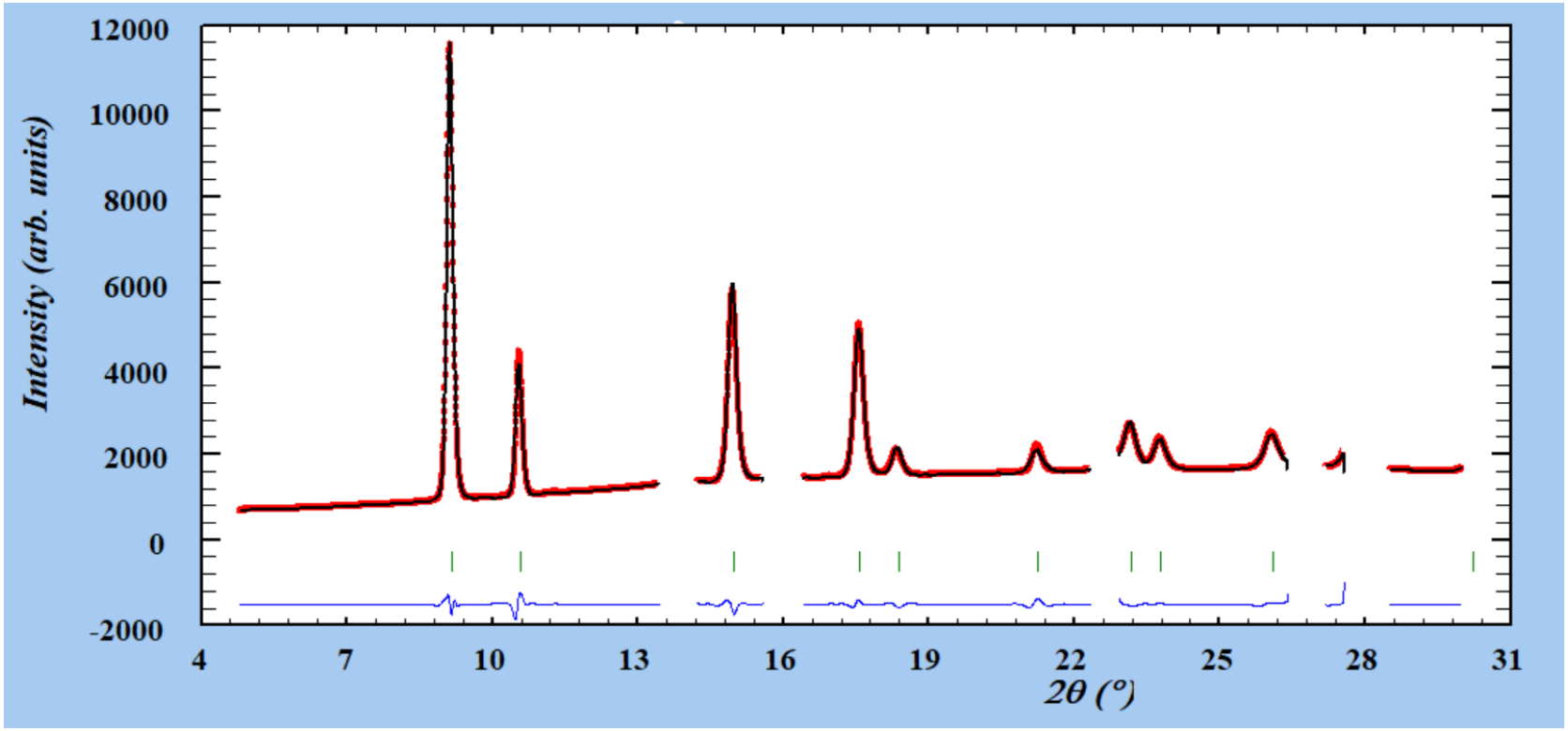

Figure S6 – Rietveld refinement plot for sample Sm20_7.54. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

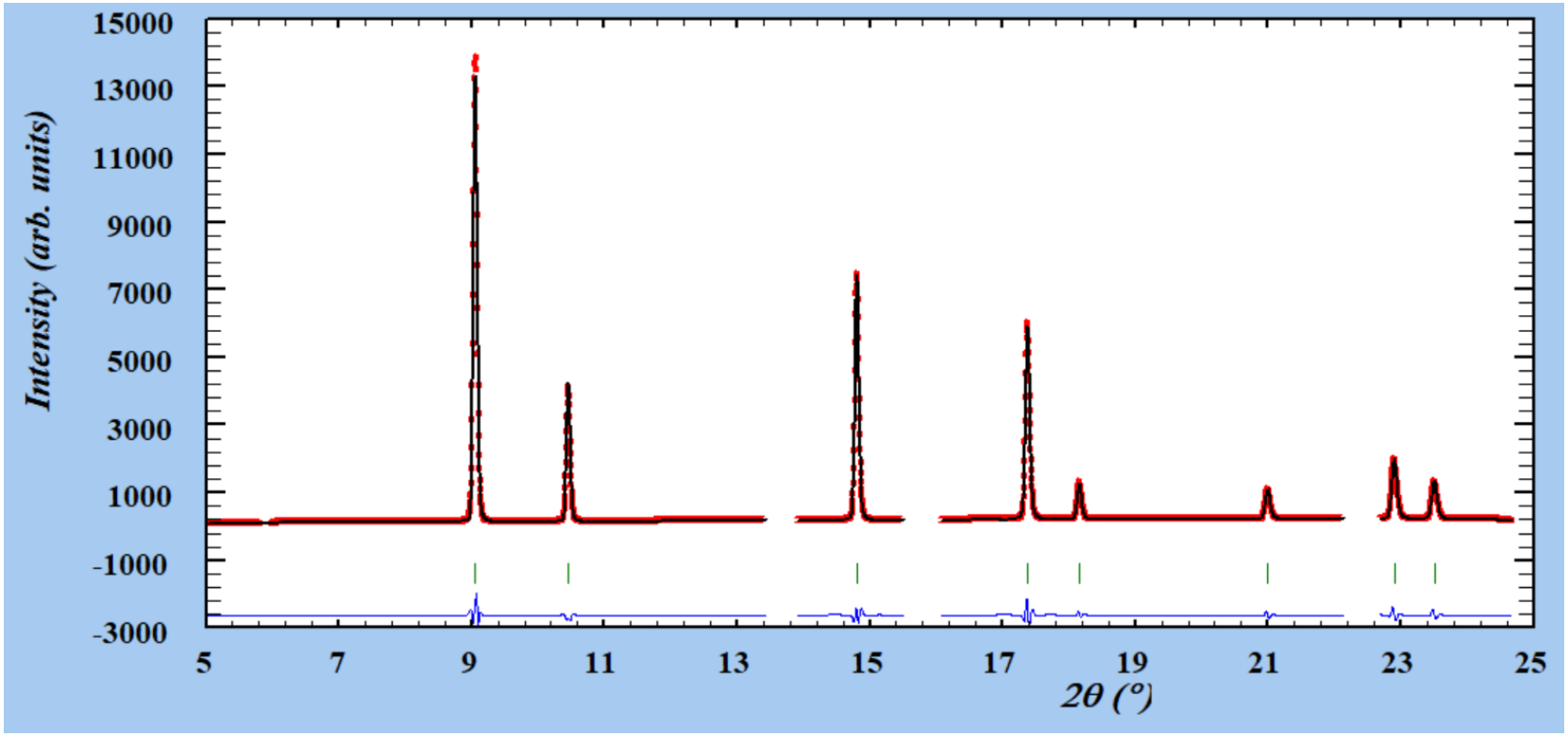

Figure S7 – Rietveld refinement plot for sample Sm30_room pressure. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

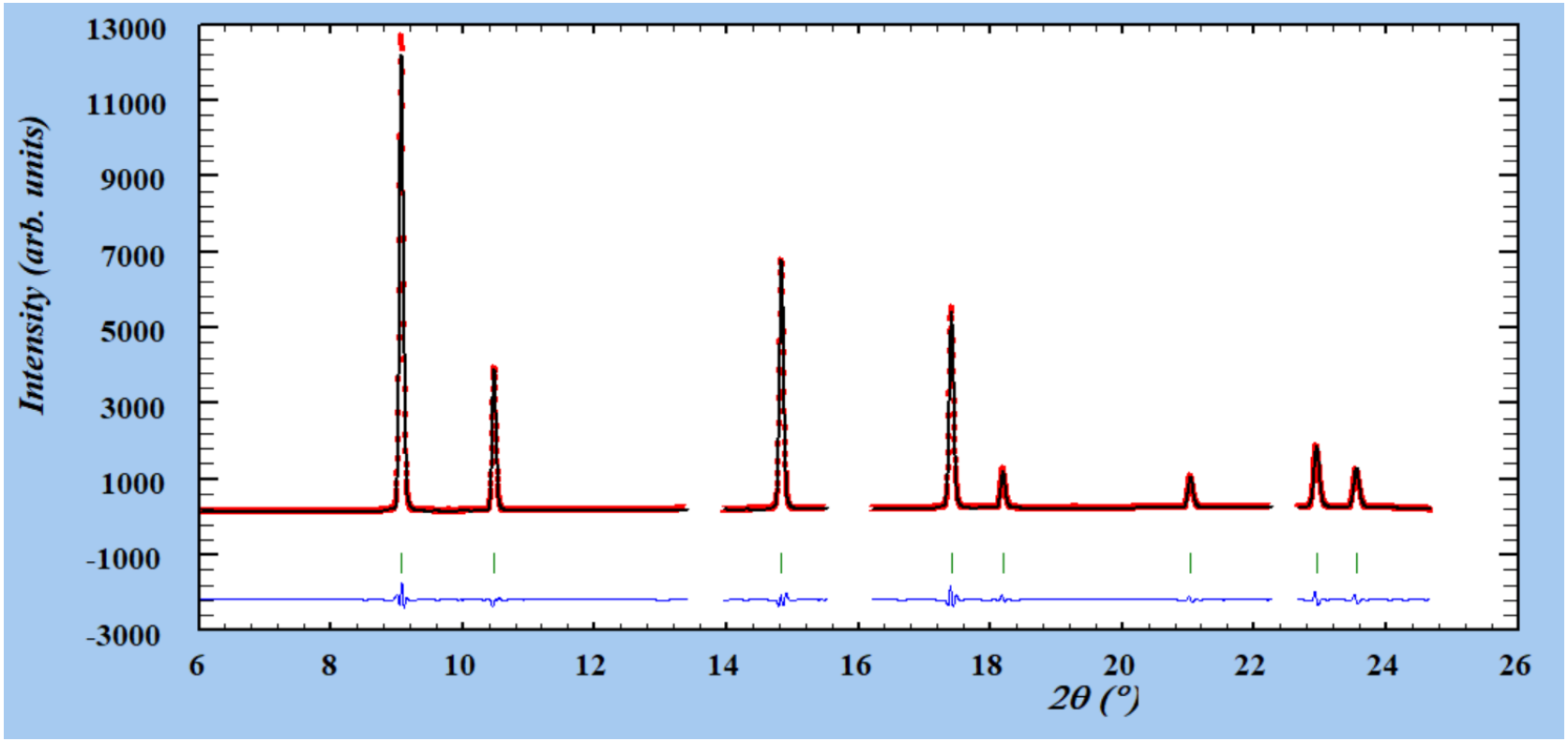

Figure S8 – Rietveld refinement plot for sample Sm30_1.15. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

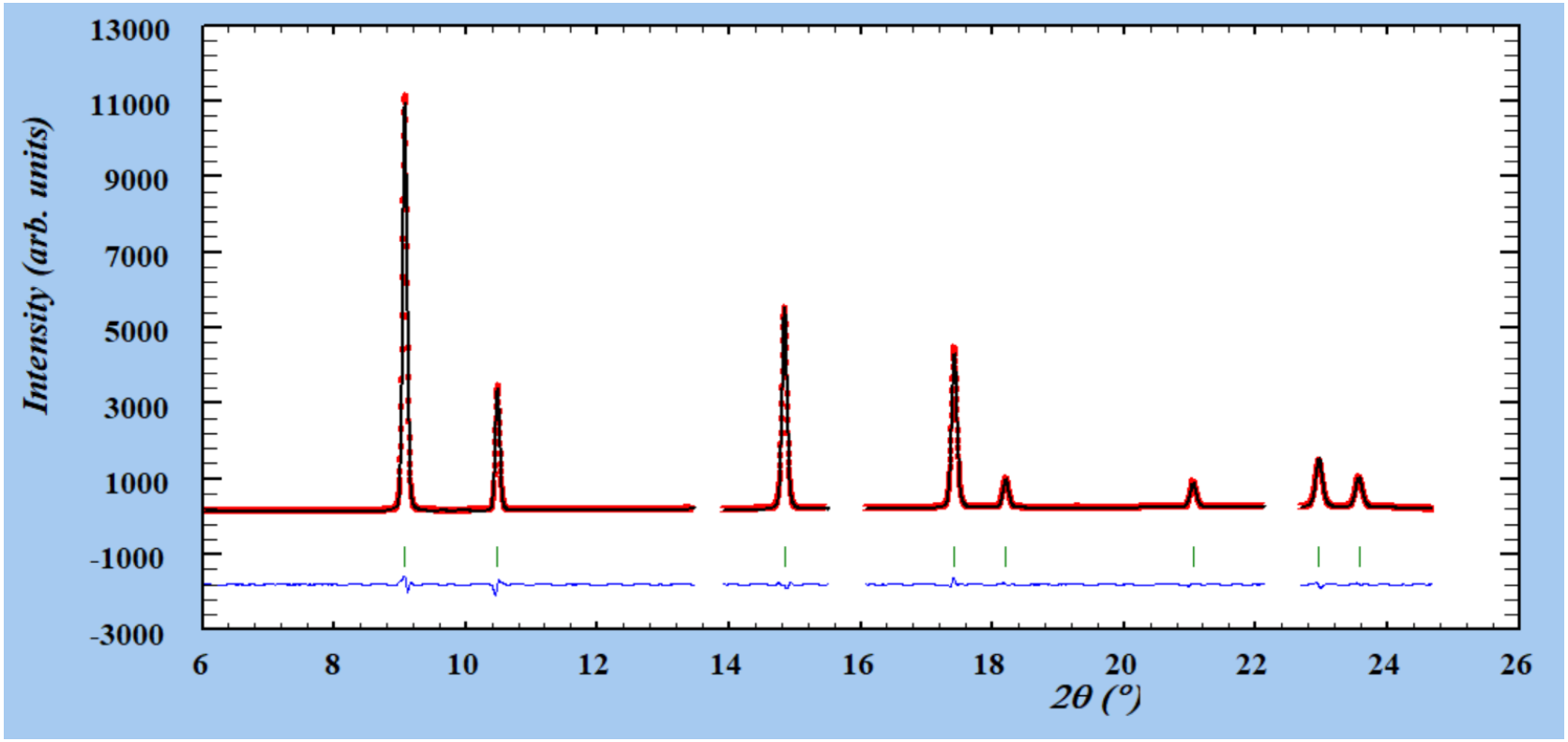

Figure S9 – Rietveld refinement plot for sample Sm30_1.85. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

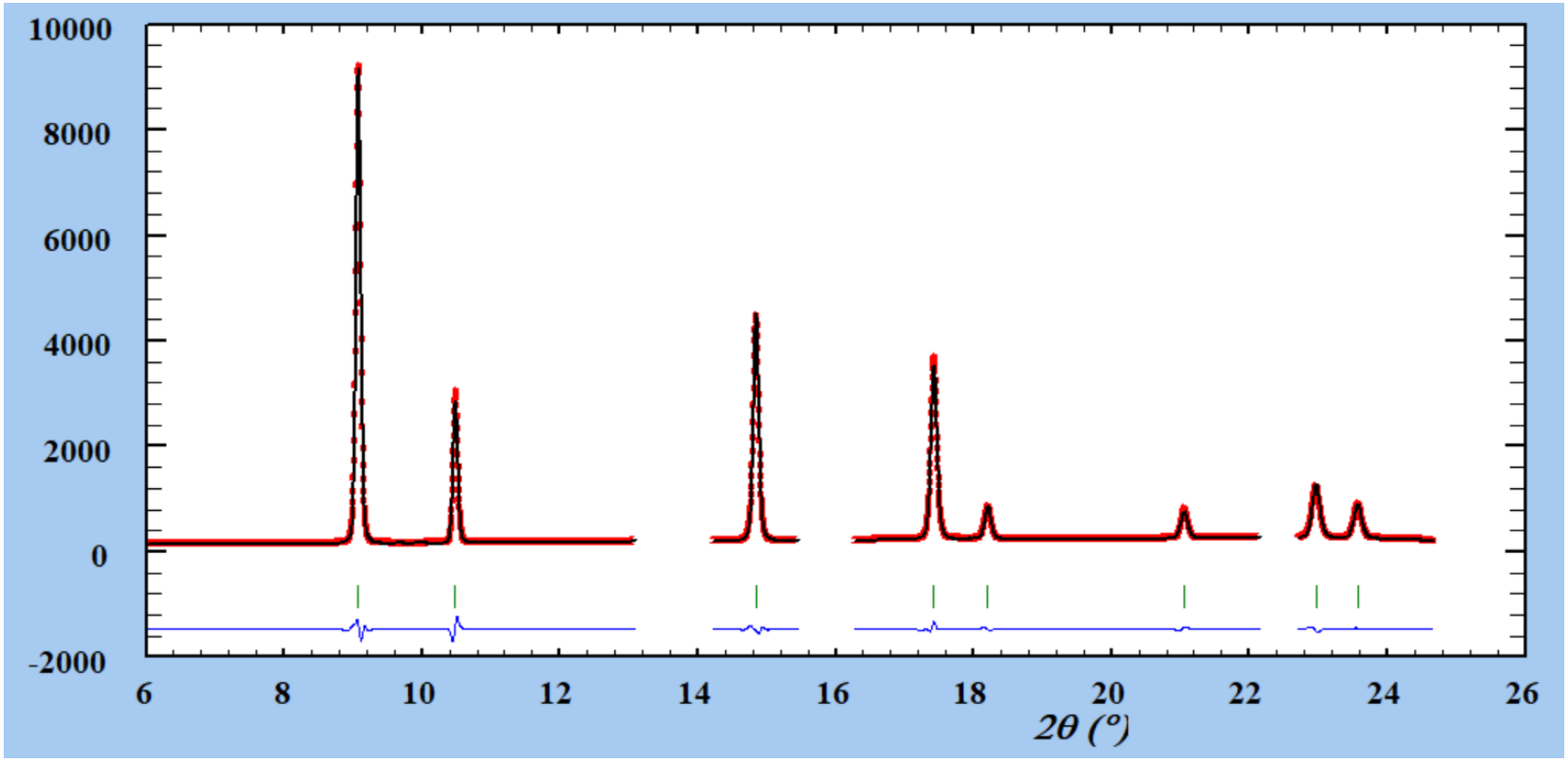

Figure S10 – Rietveld refinement plot for sample Sm30_1.95. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

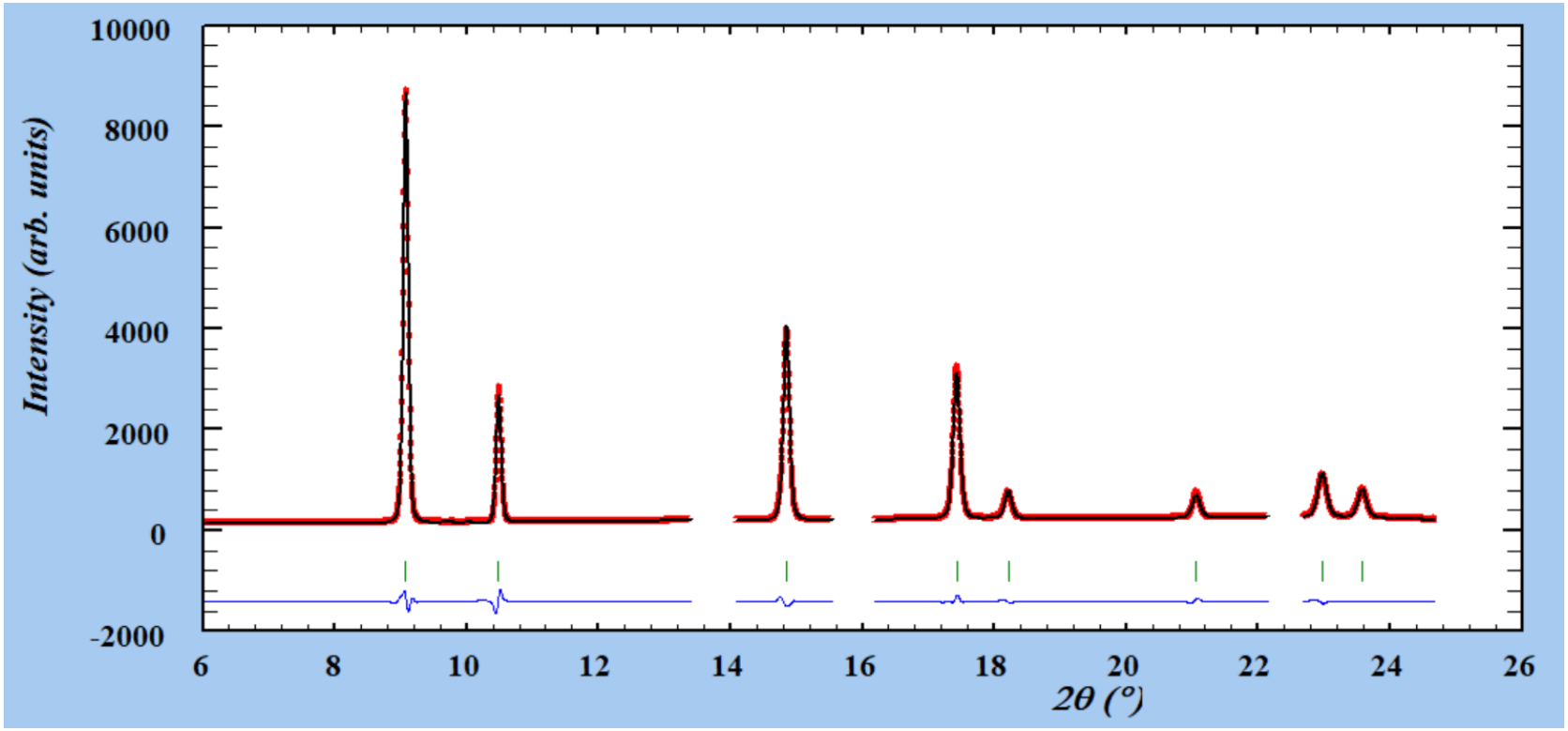

Figure S11 – Rietveld refinement plot for sample Sm30_2.18. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

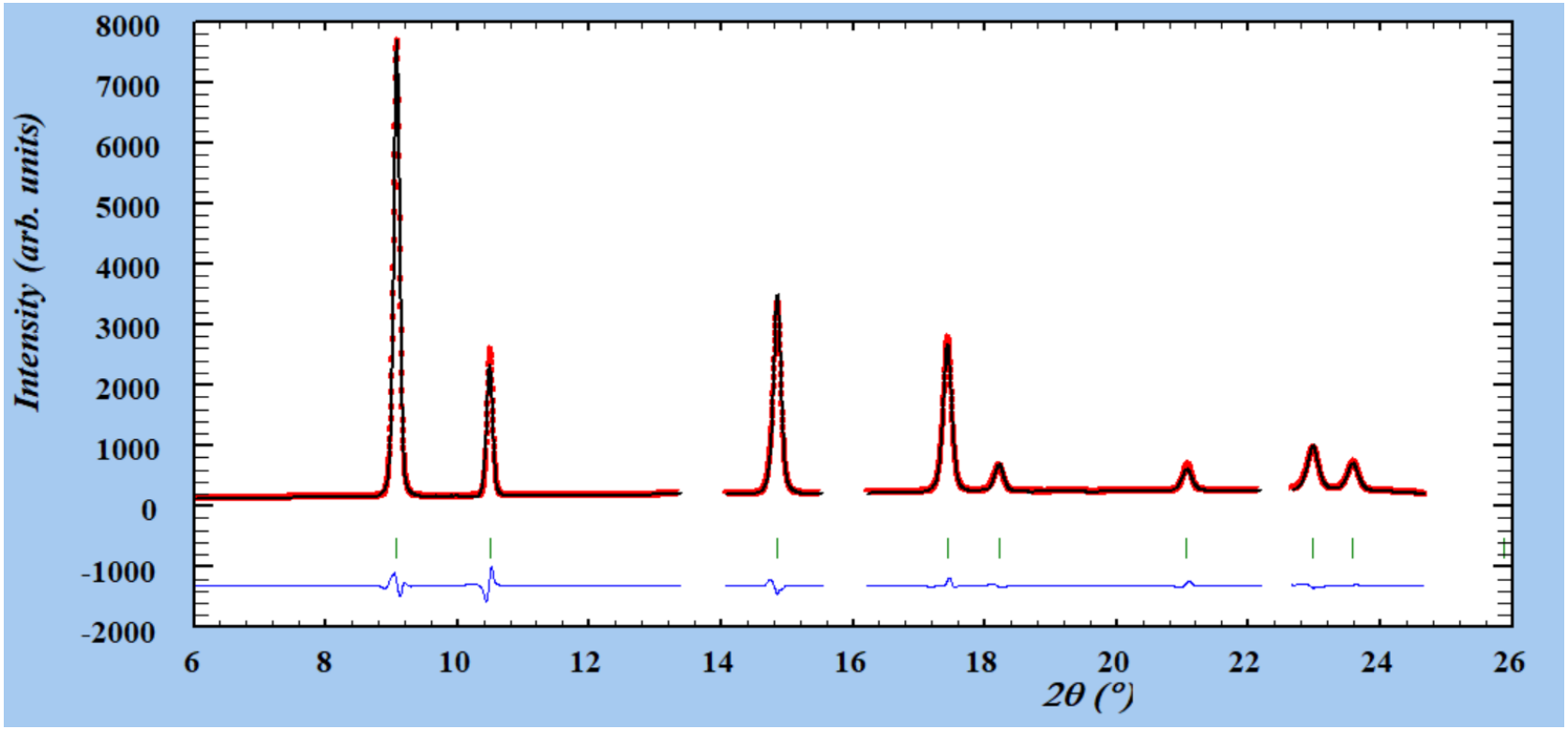

Figure S12 – Rietveld refinement plot for sample Sm30_2.63. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

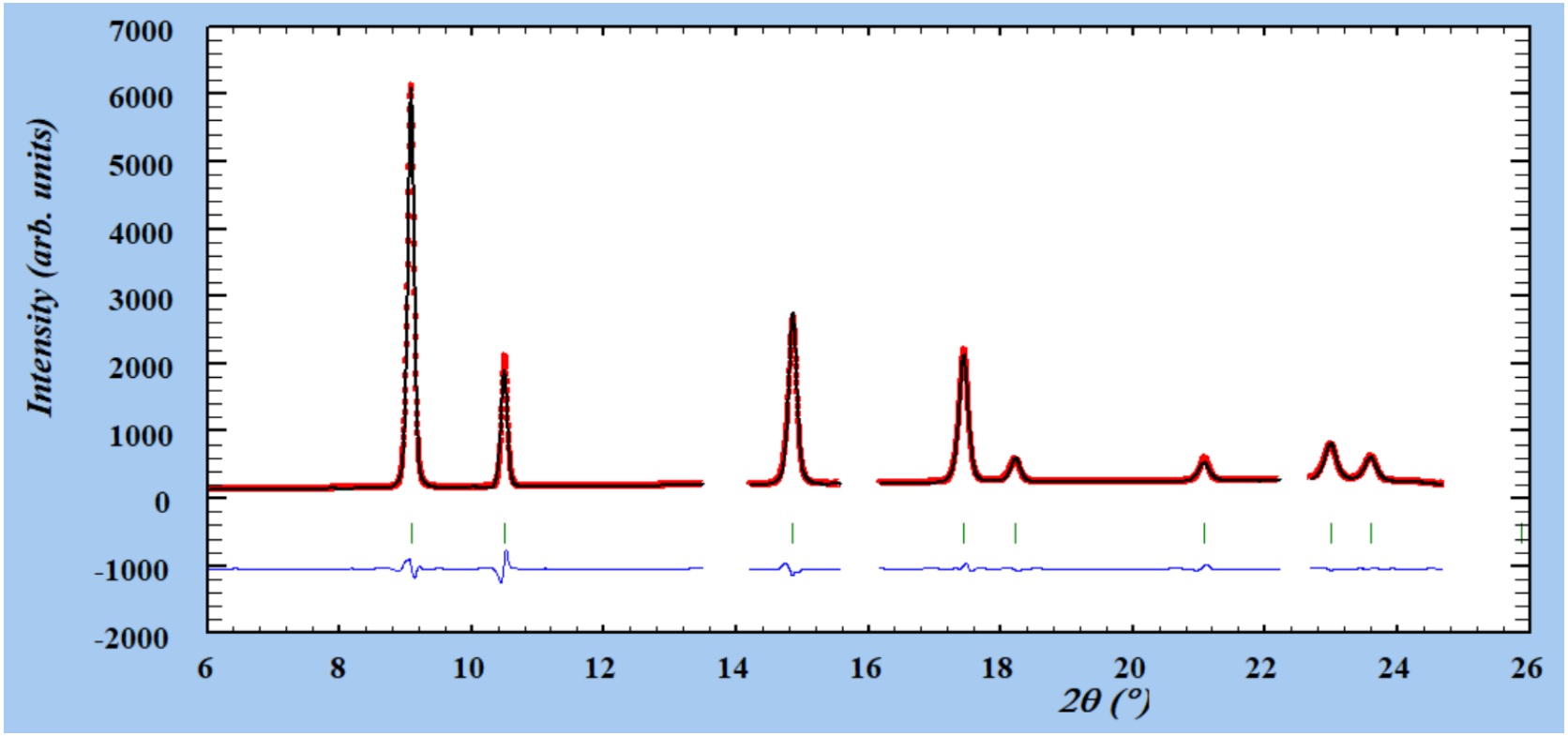

Figure S13 – Rietveld refinement plot for sample Sm30_2.99. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

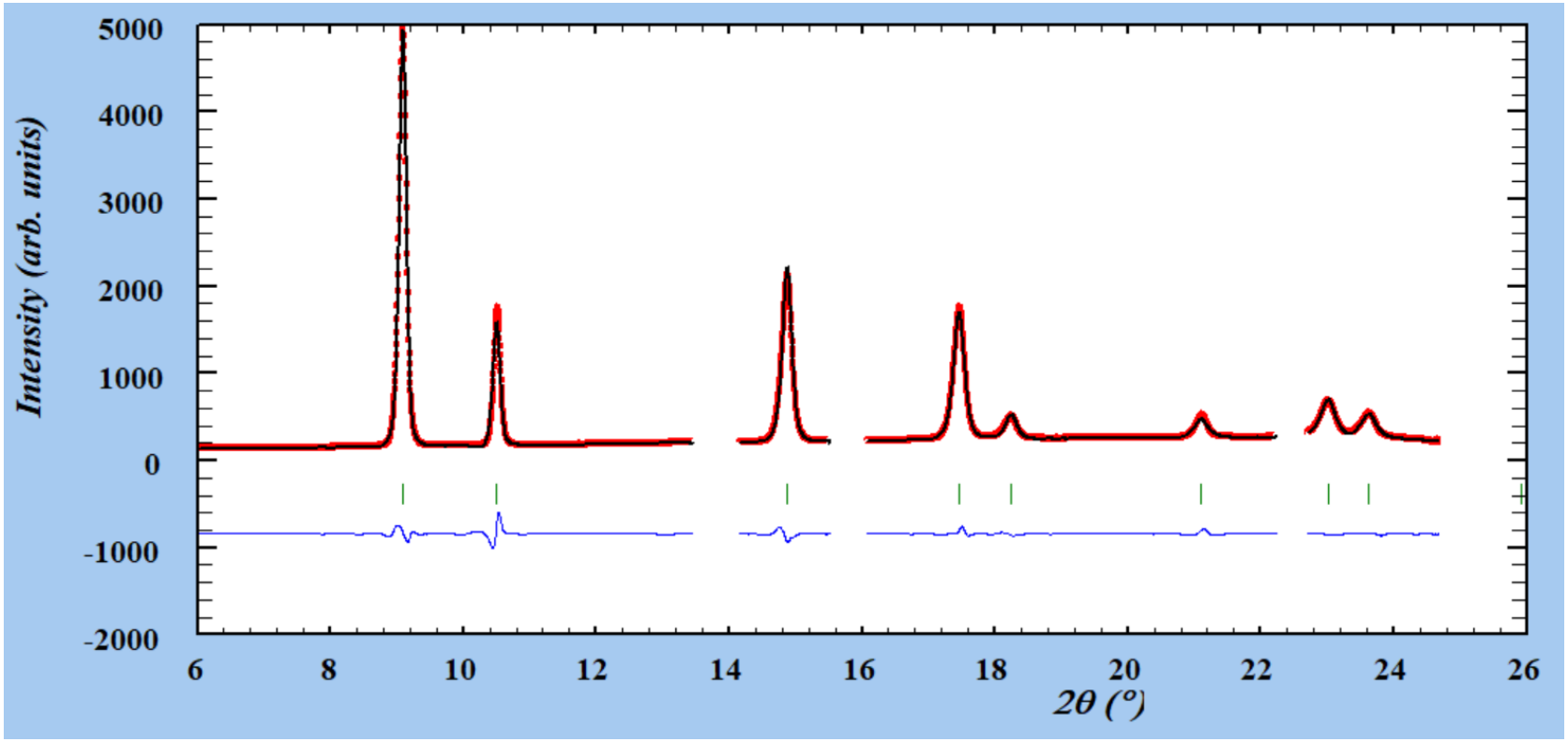

Figure S14 – Rietveld refinement plot for sample Sm30_4.18. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

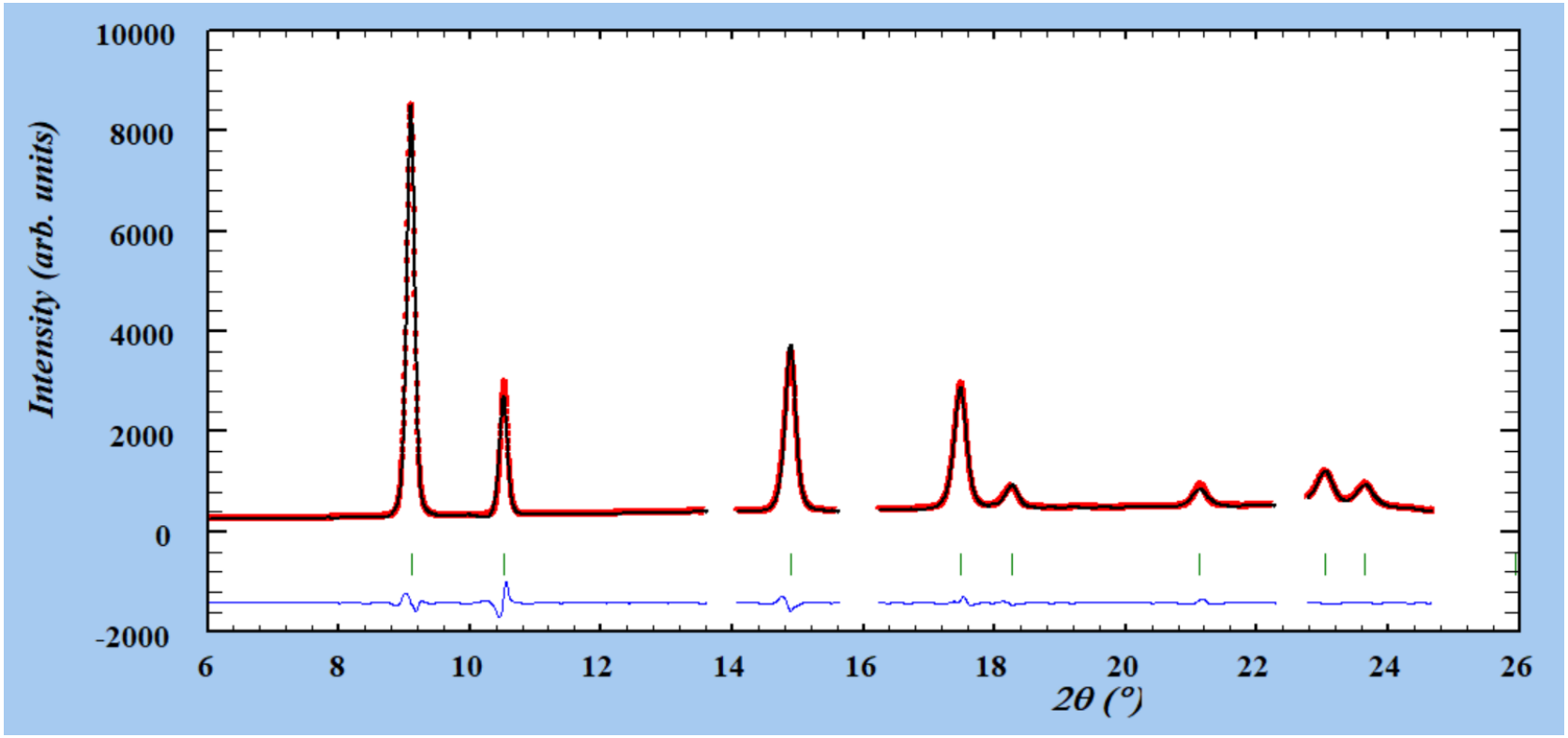

Figure S15 – Rietveld refinement plot for sample Sm30_5.23. Excluded regions are placed in correspondence of Bragg peaks of Cu, which was used to calibrate the applied pressure.

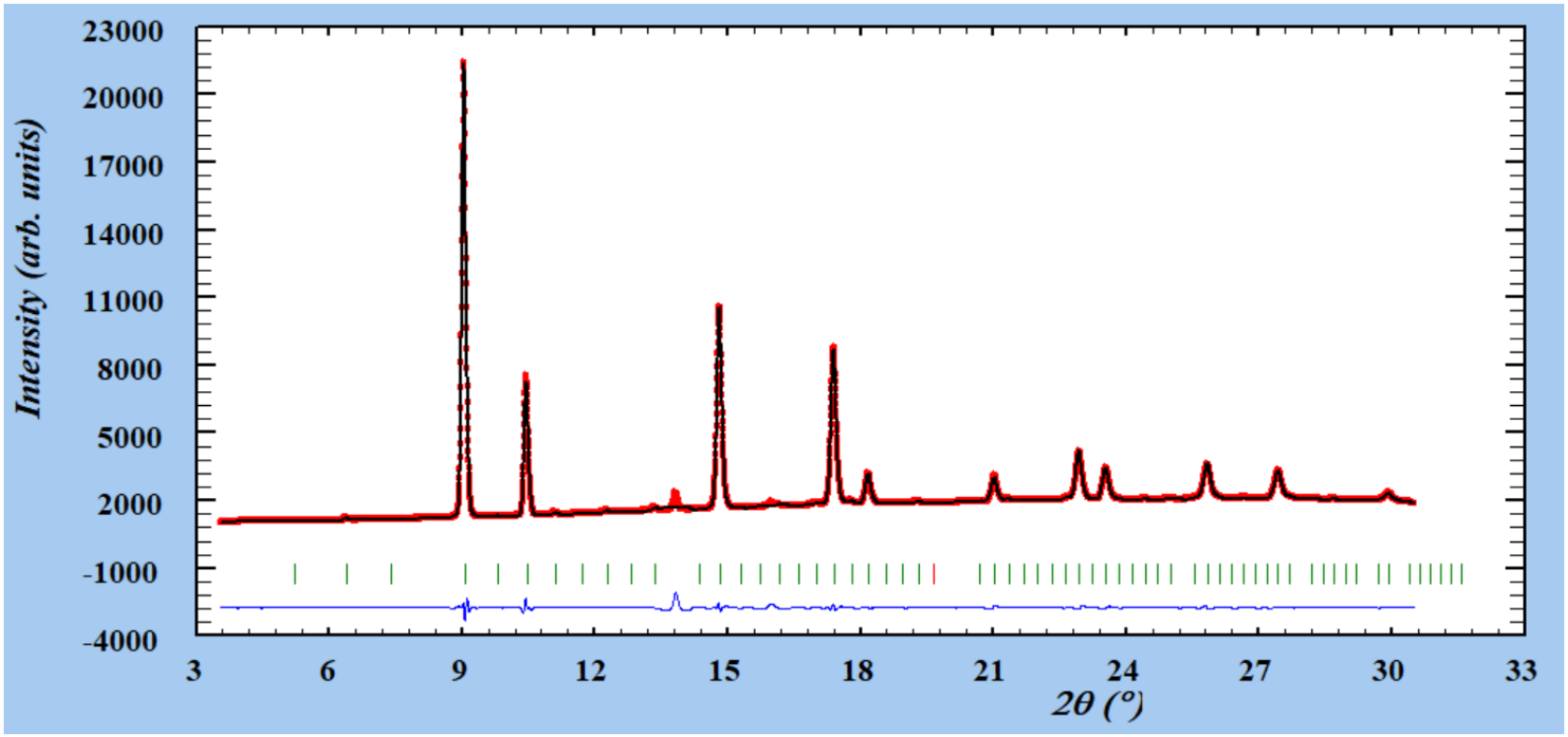

Figure S16 – Rietveld refinement plot for sample Sm40_2.42.

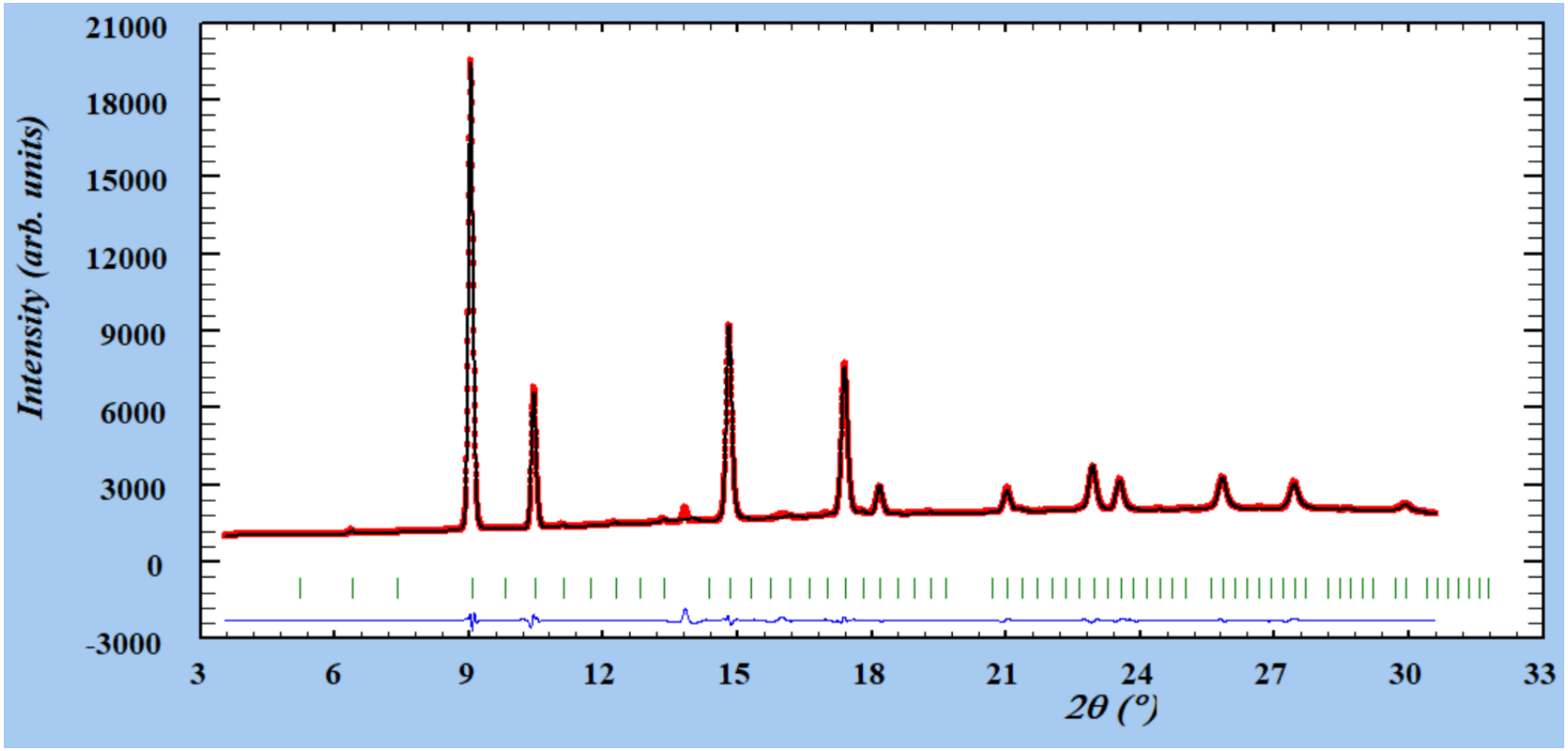

Figure S17 – Rietveld refinement plot for sample Sm40_3.00.

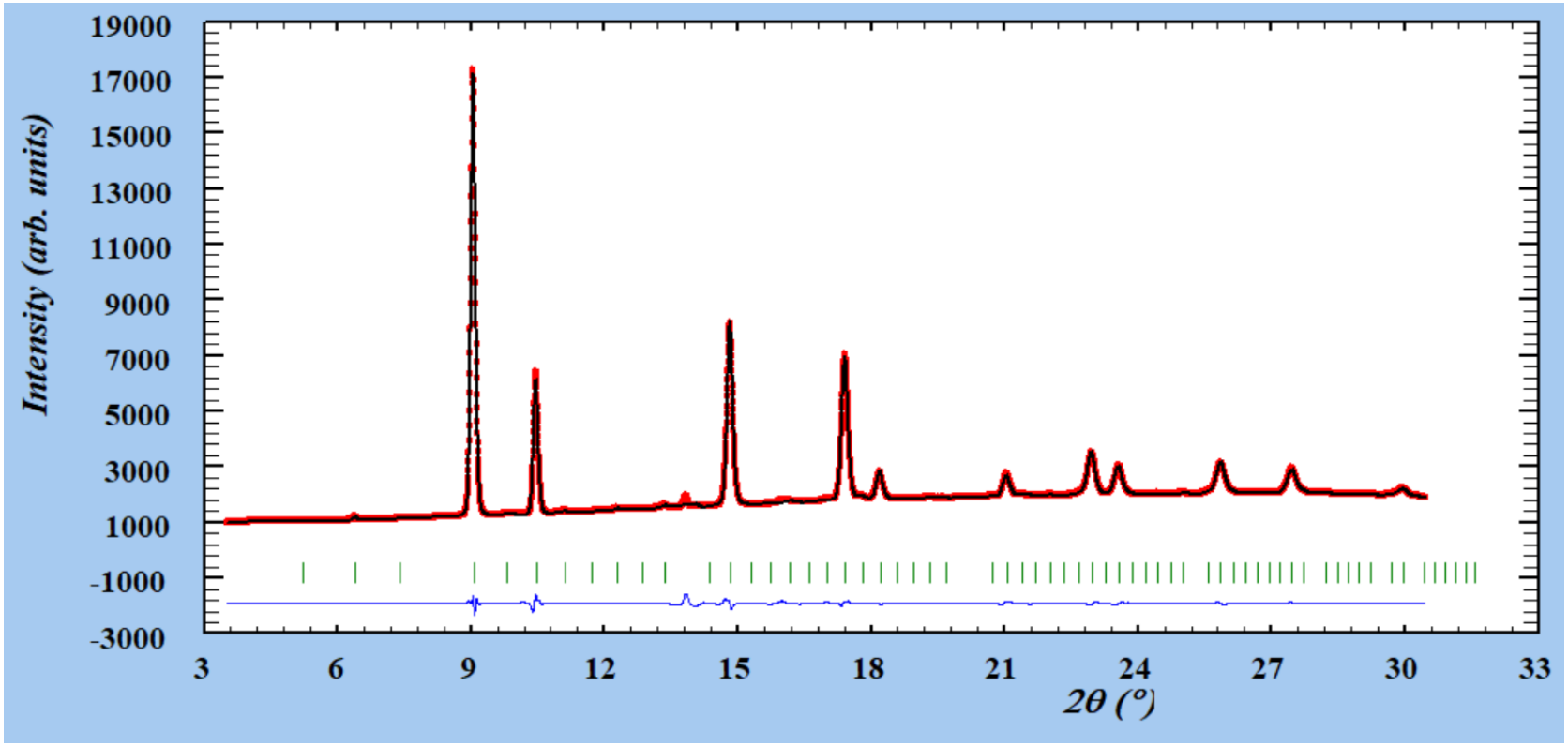

Figure S18 – Rietveld refinement plot for sample Sm40_3.17.

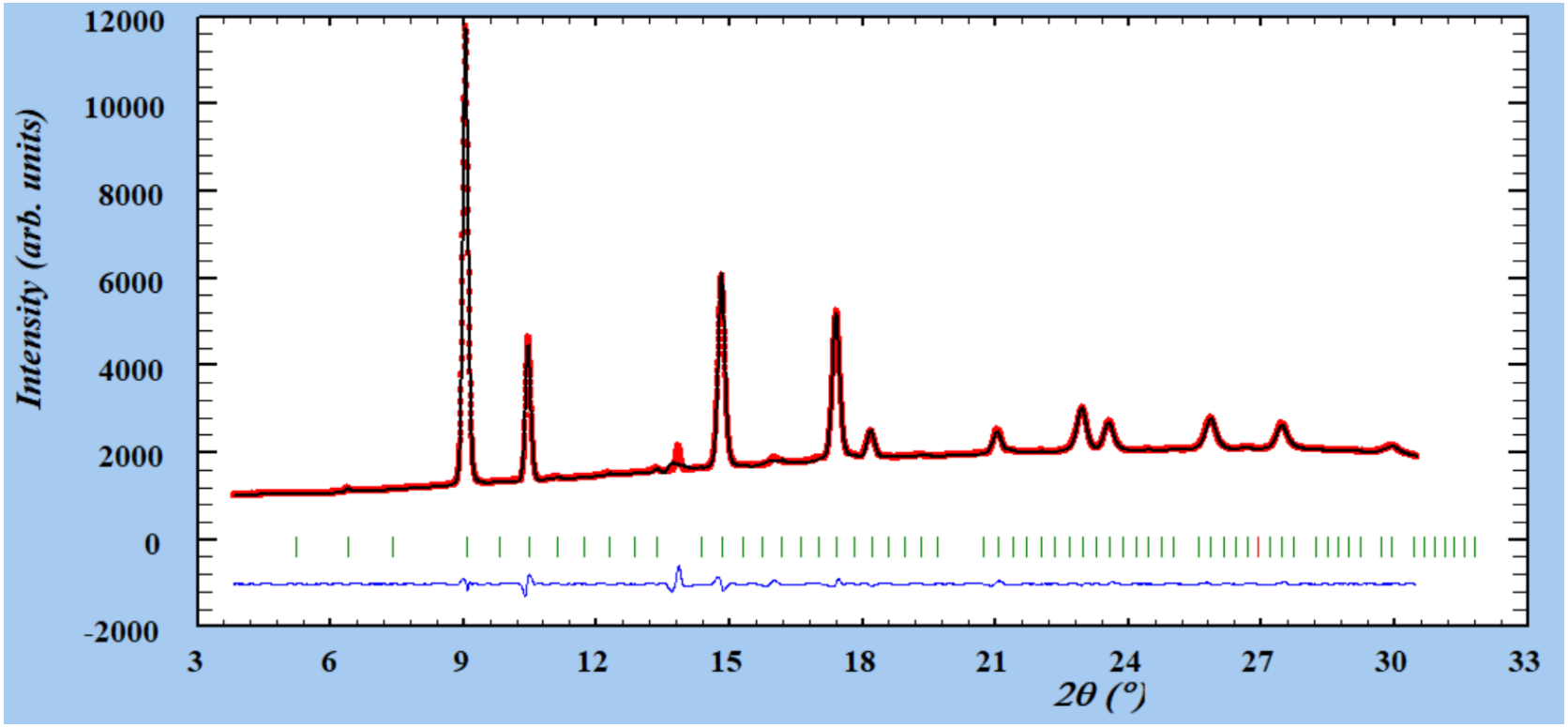

Figure S19 – Rietveld refinement plot for sample Sm40_3.73.

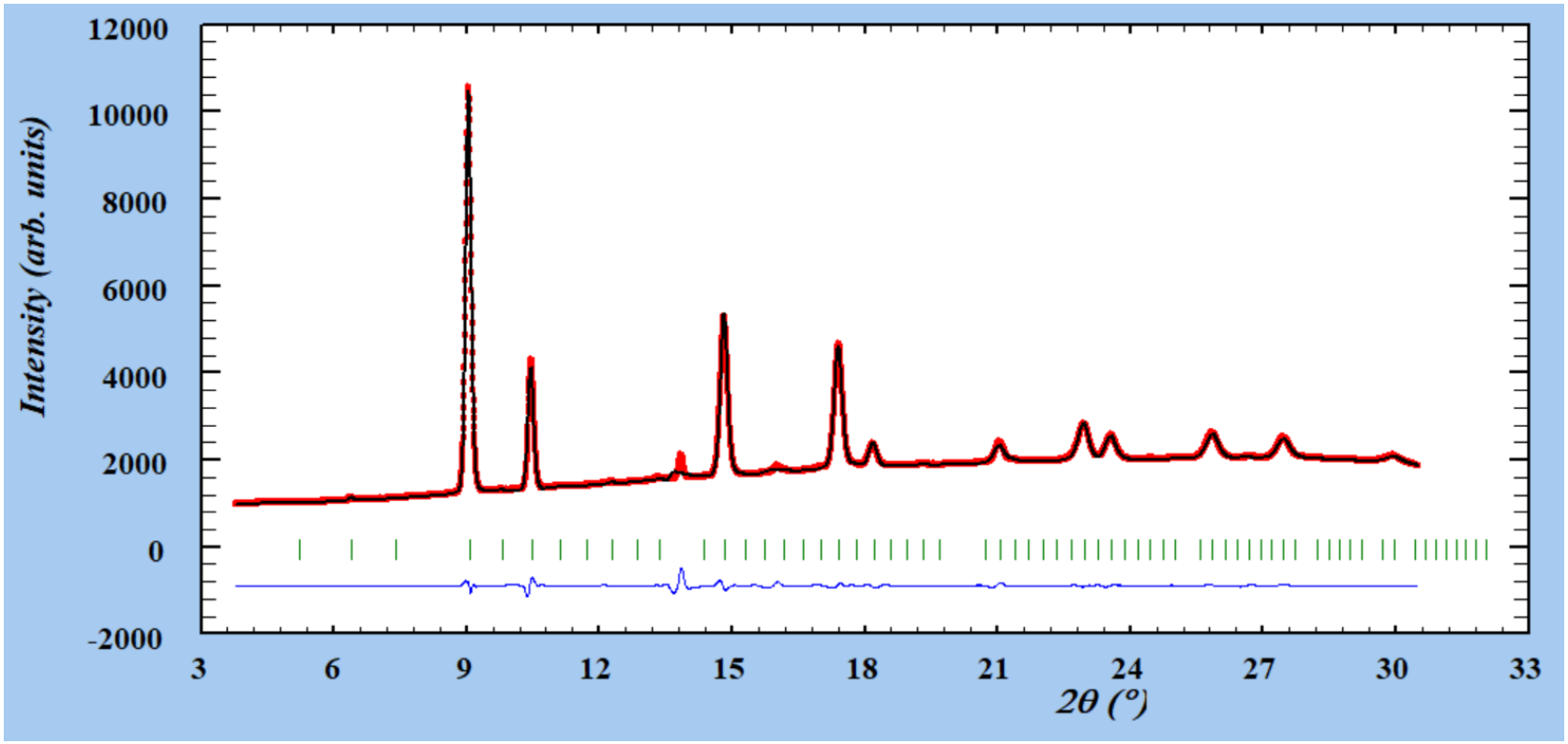

Figure S20 – Rietveld refinement plot for sample Sm40_4.11.

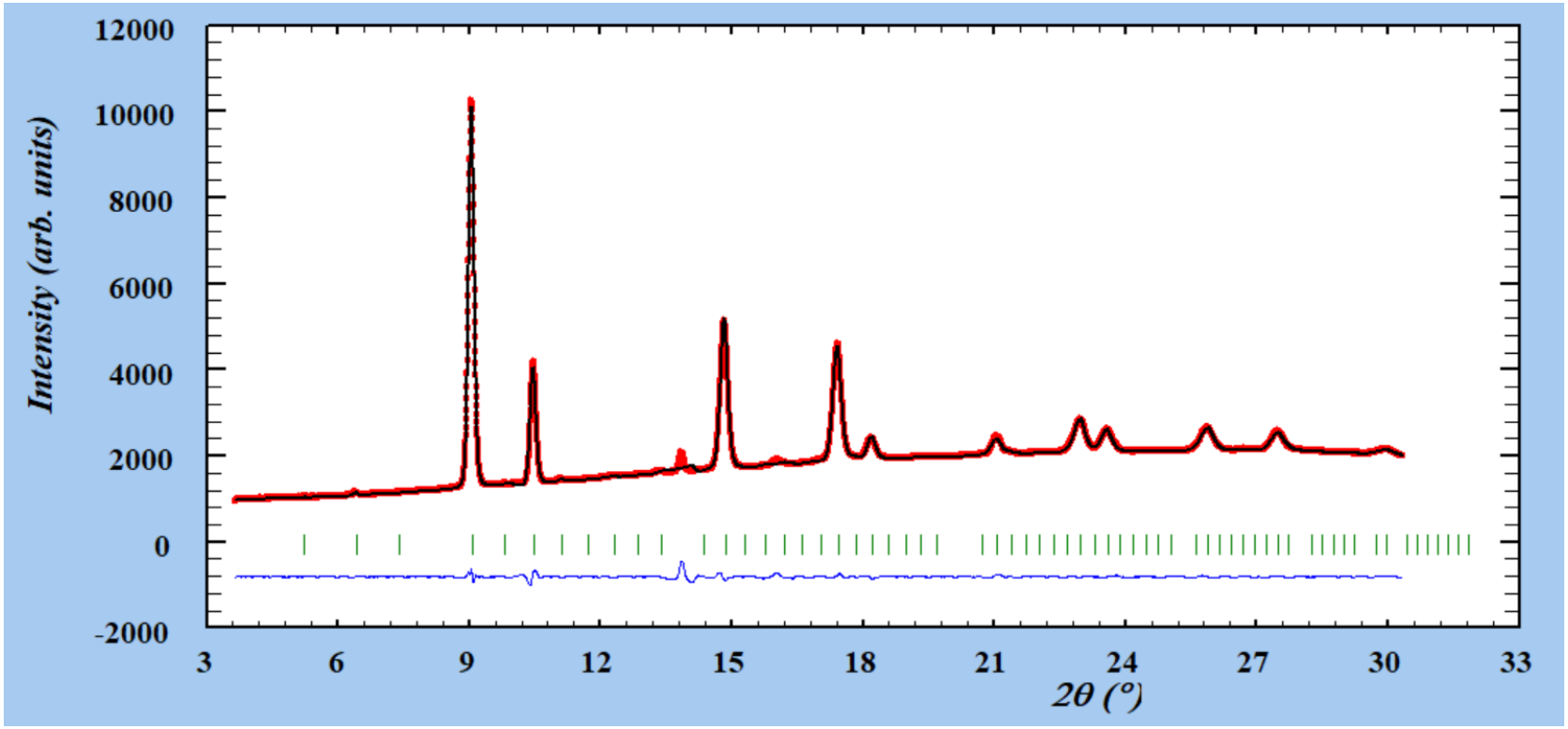

Figure S21 – Rietveld refinement plot for sample Sm40_4.67.

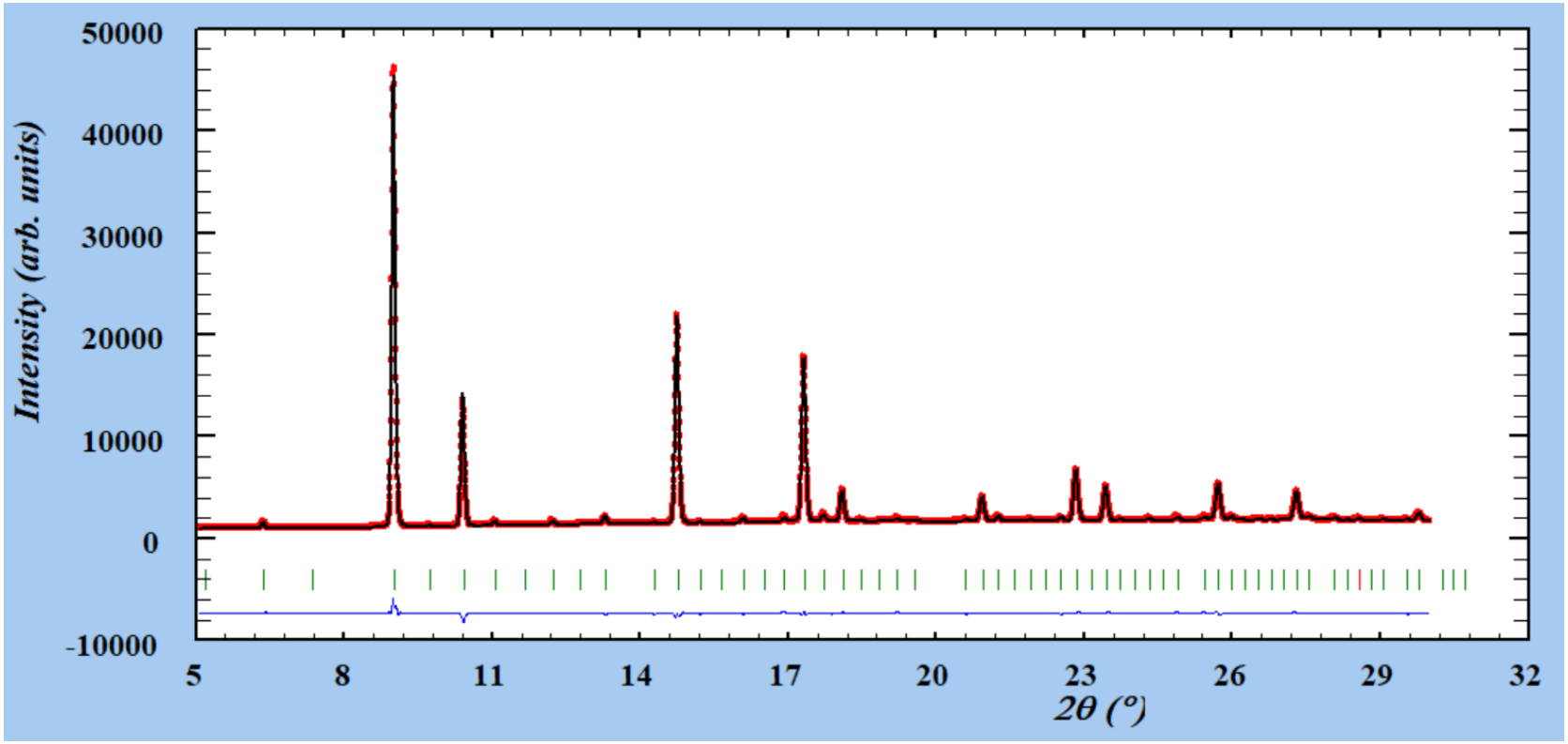

Figure S22 – Rietveld refinement plot for sample Sm50_room pressure.

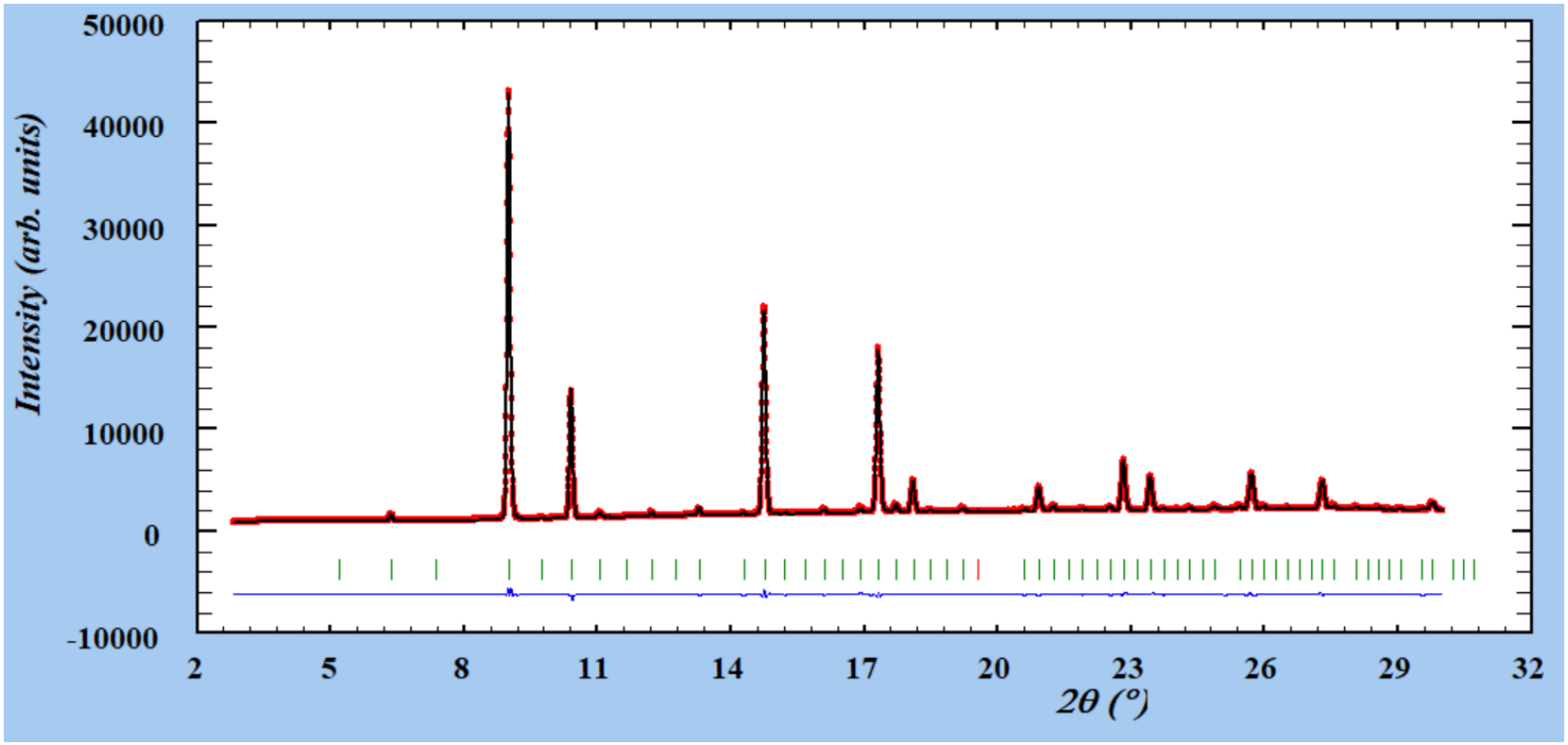

Figure S23 – Rietveld refinement plot for sample Sm50_0.20.

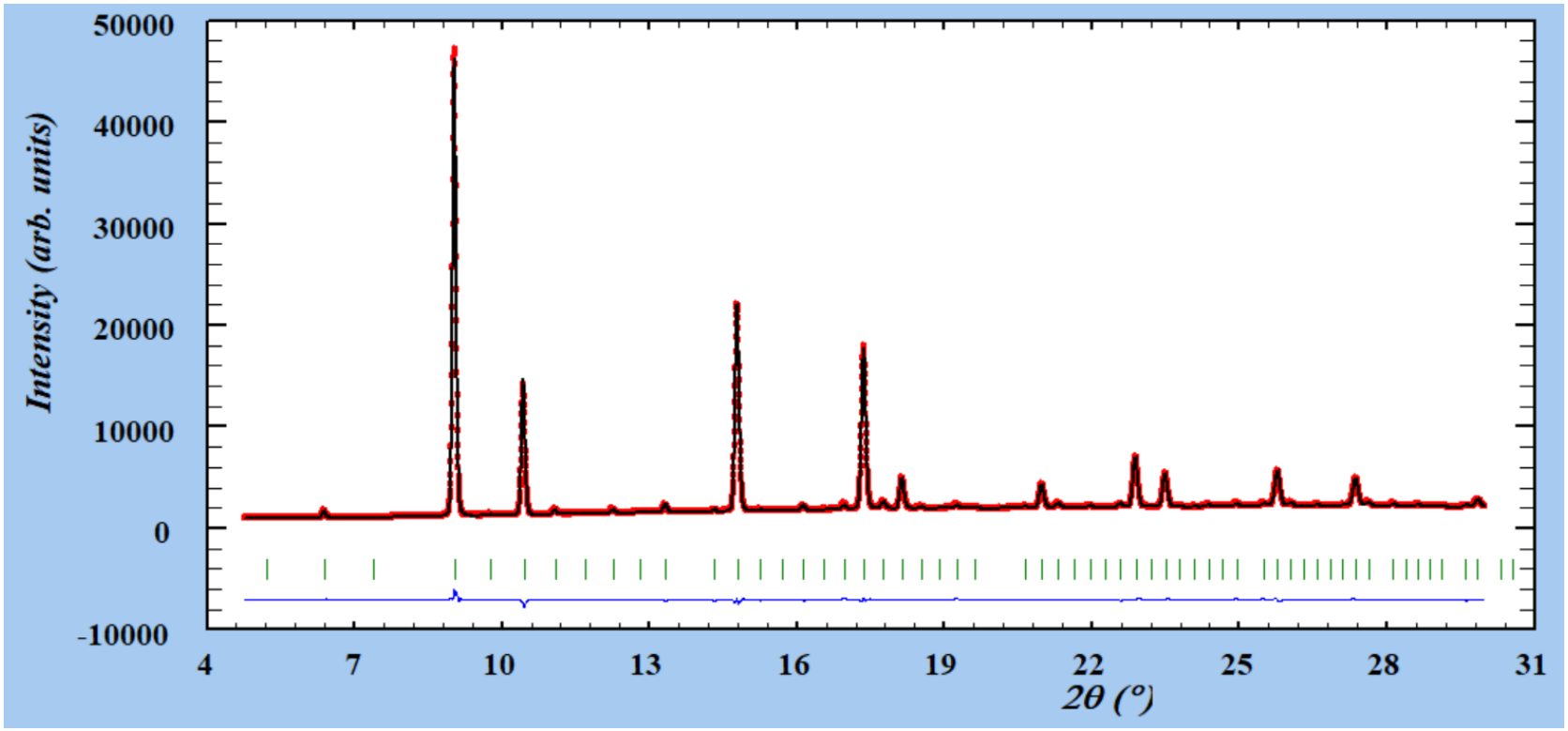

Figure S24 – Rietveld refinement plot for sample Sm50_1.11.

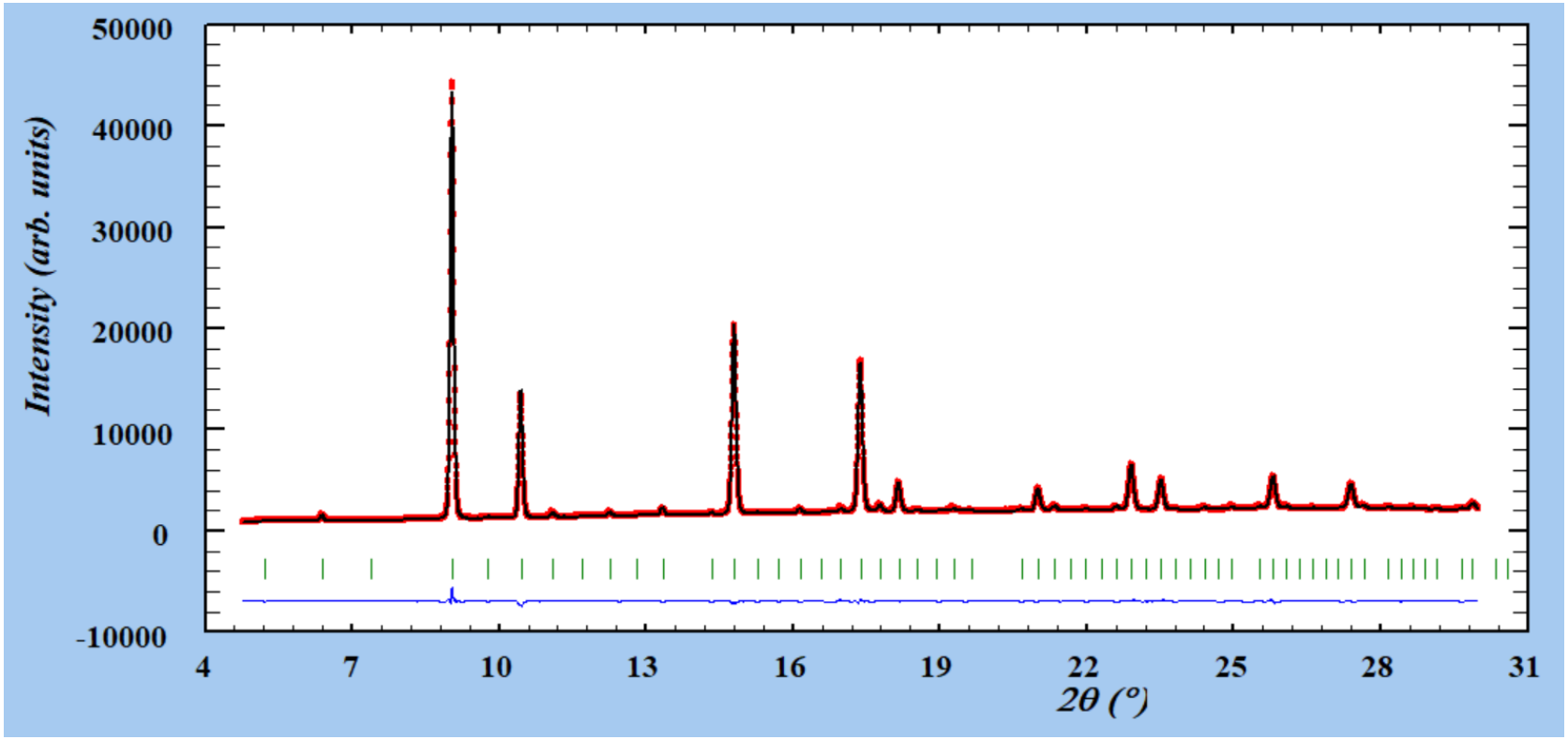

Figure S25 – Rietveld refinement plot for sample Sm50_1.86.

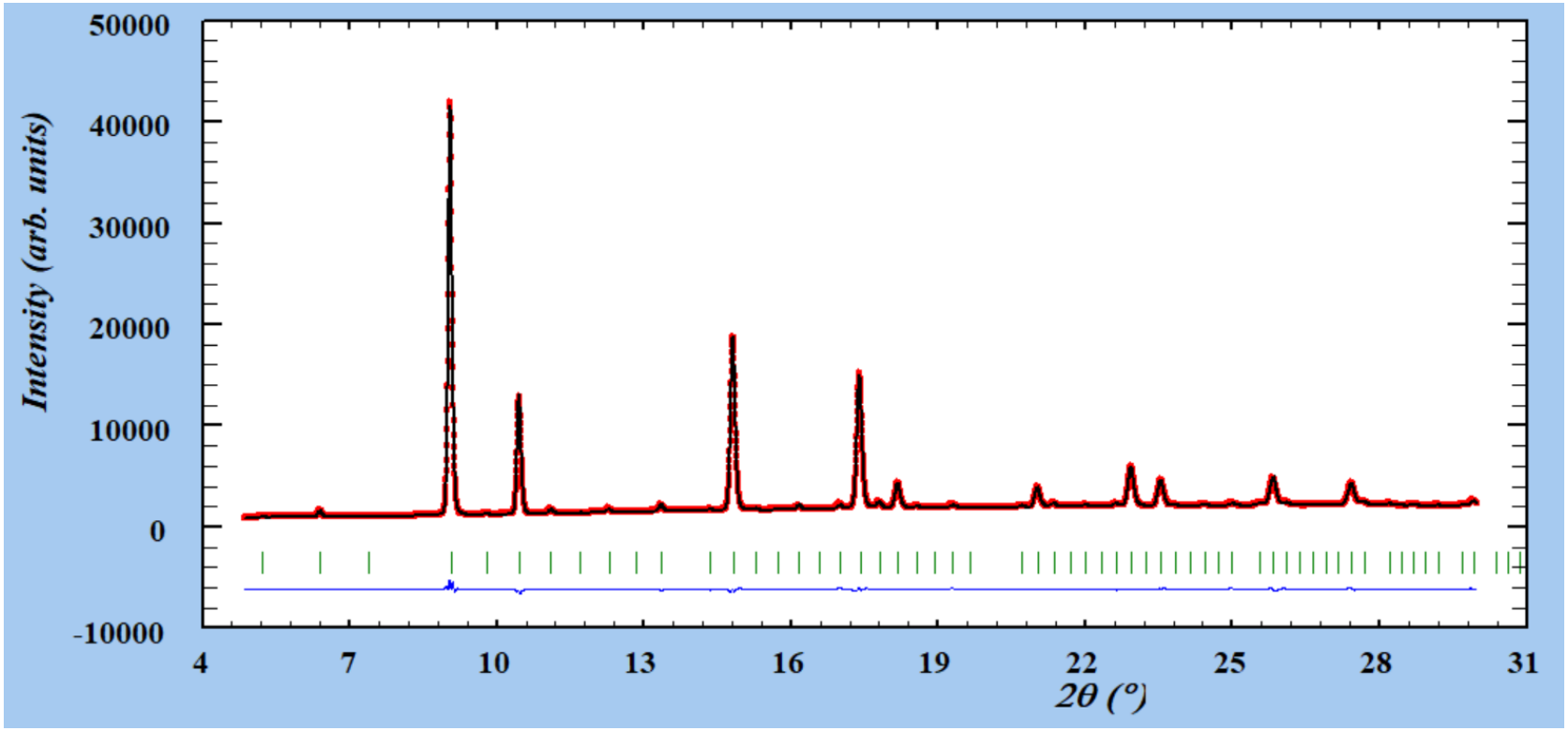

Figure S26 – Rietveld refinement plot for sample Sm50_2.60.

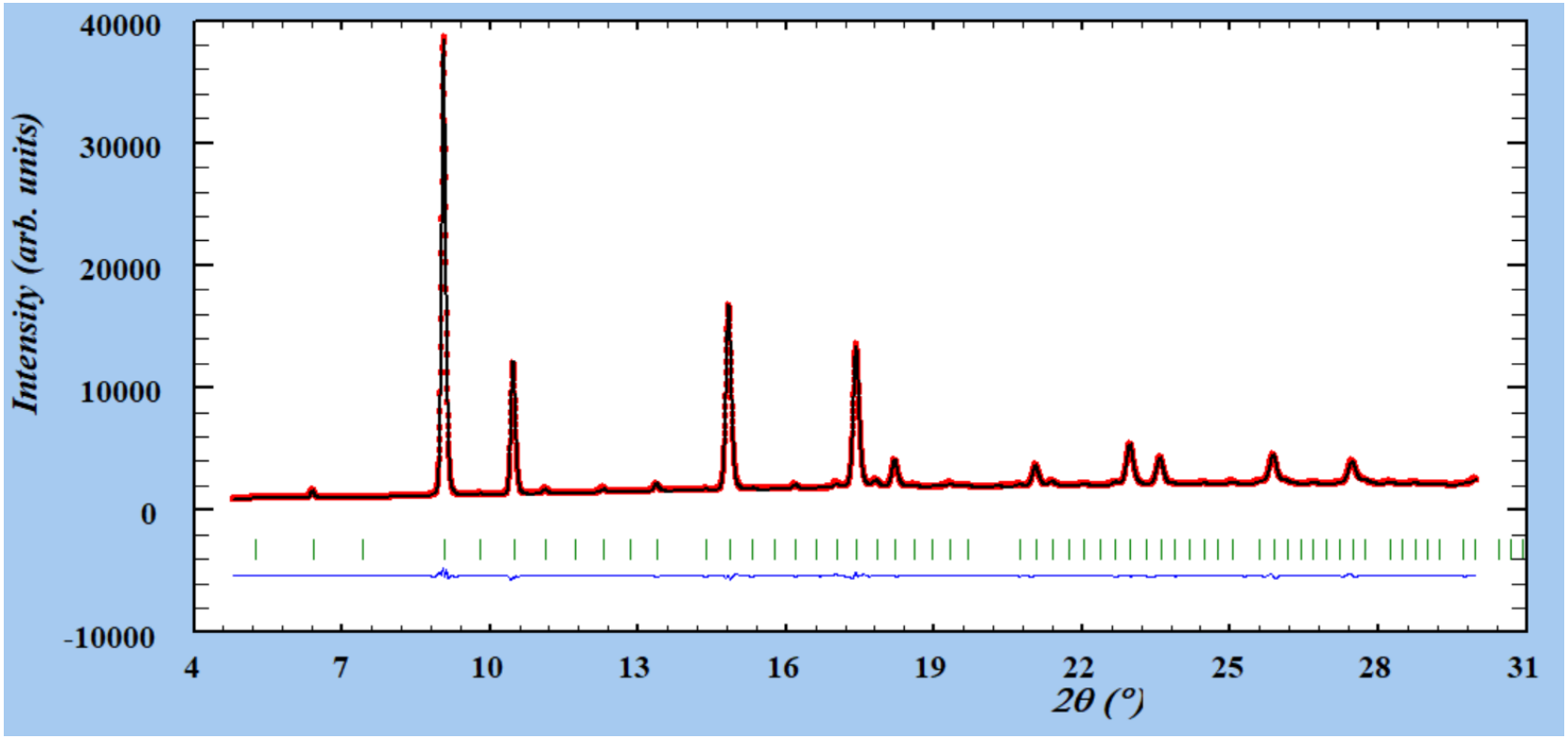

Figure S27 – Rietveld refinement plot for sample Sm50_3.92.

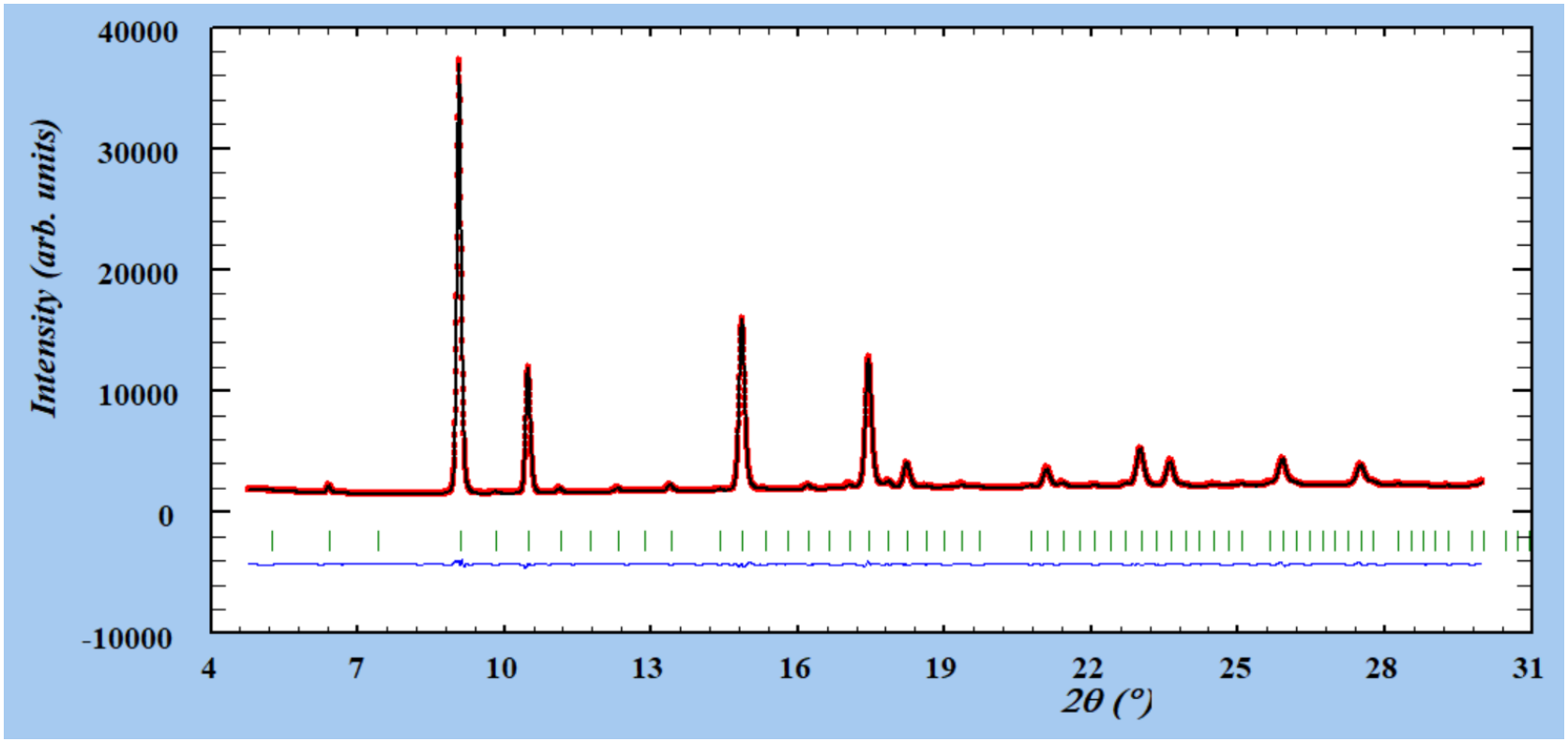

Figure S28 – Rietveld refinement plot for sample Sm50_5.05.

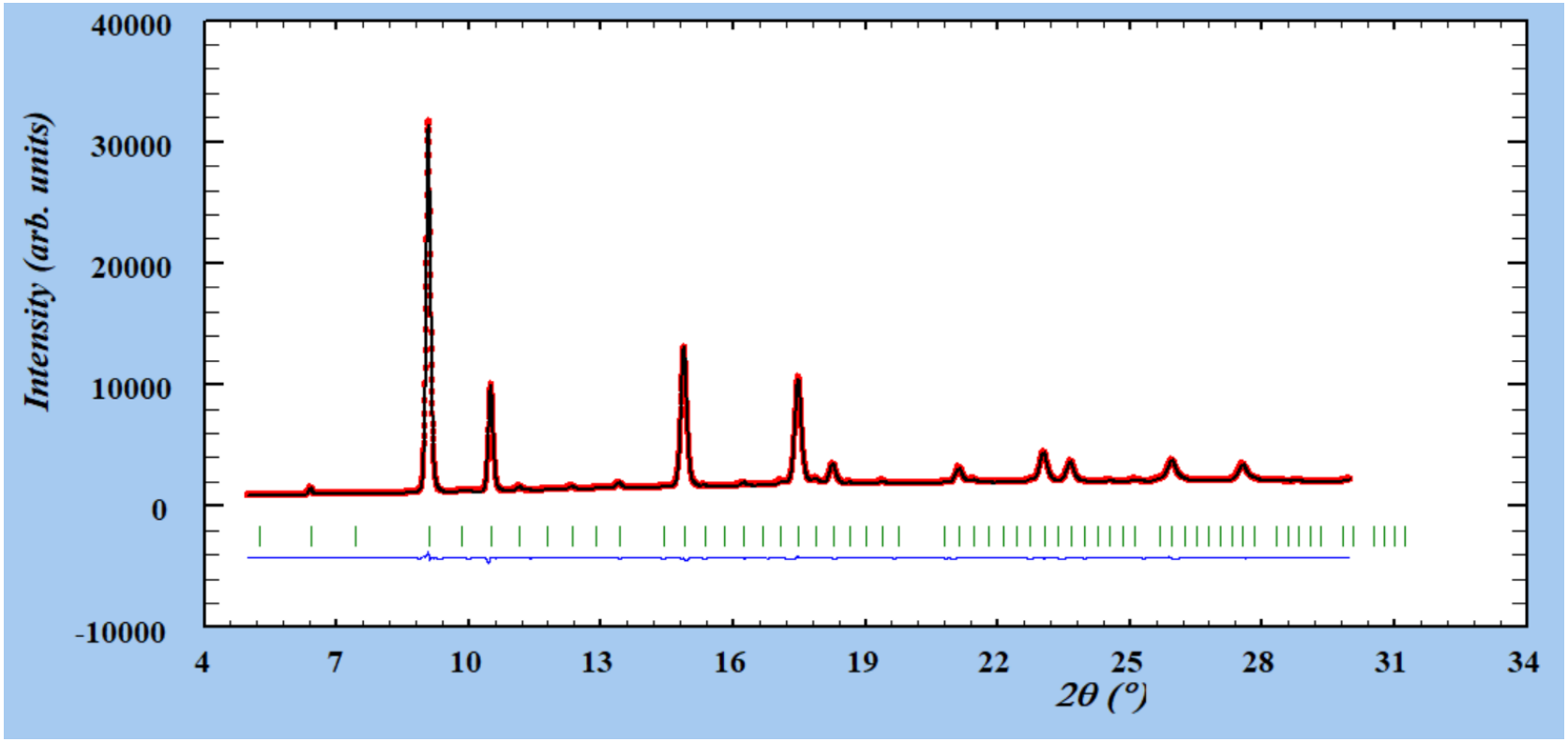

Figure S29 – Rietveld refinement plot for sample Sm50_6.94.

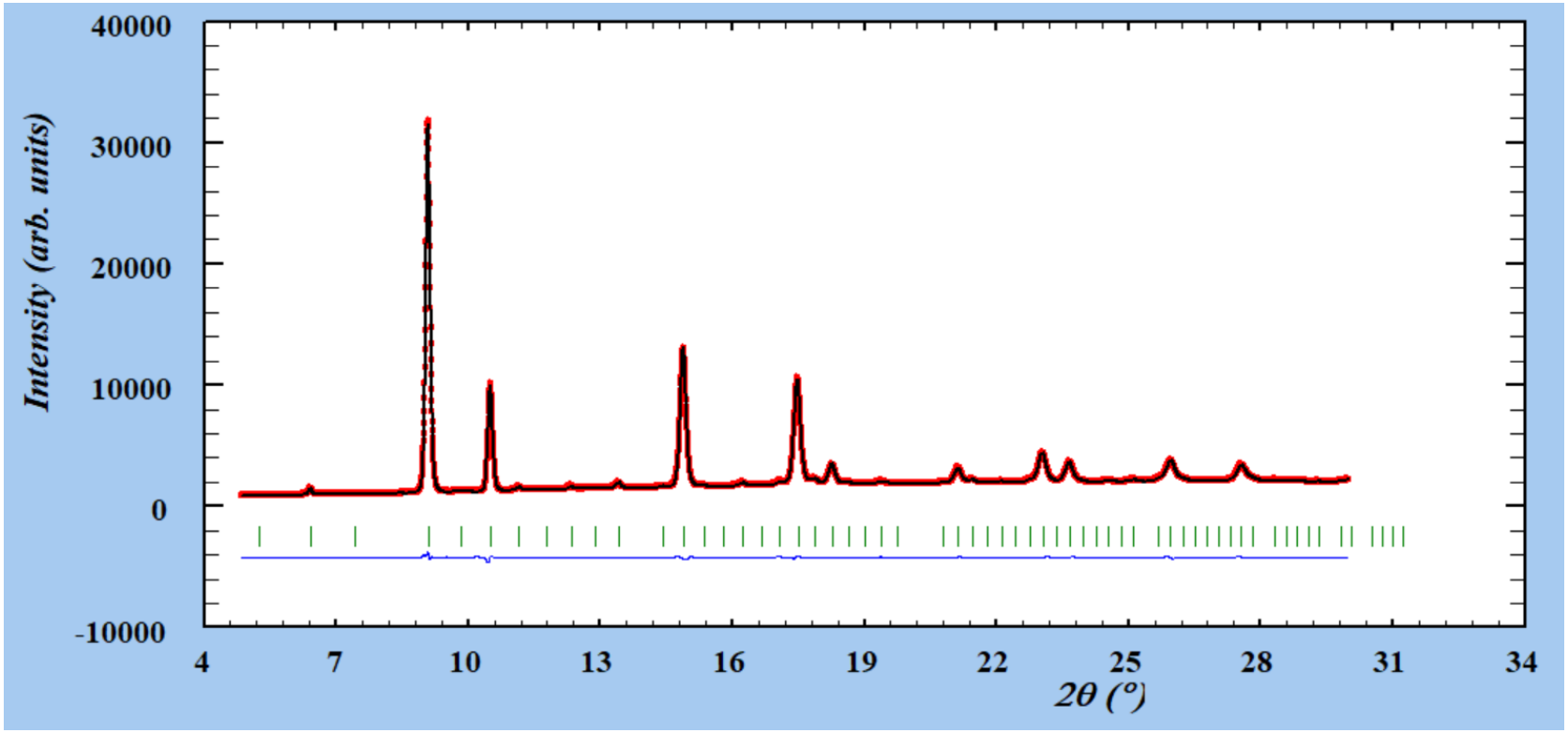

Figure S30 – Rietveld refinement plot for sample Sm50_7.32.

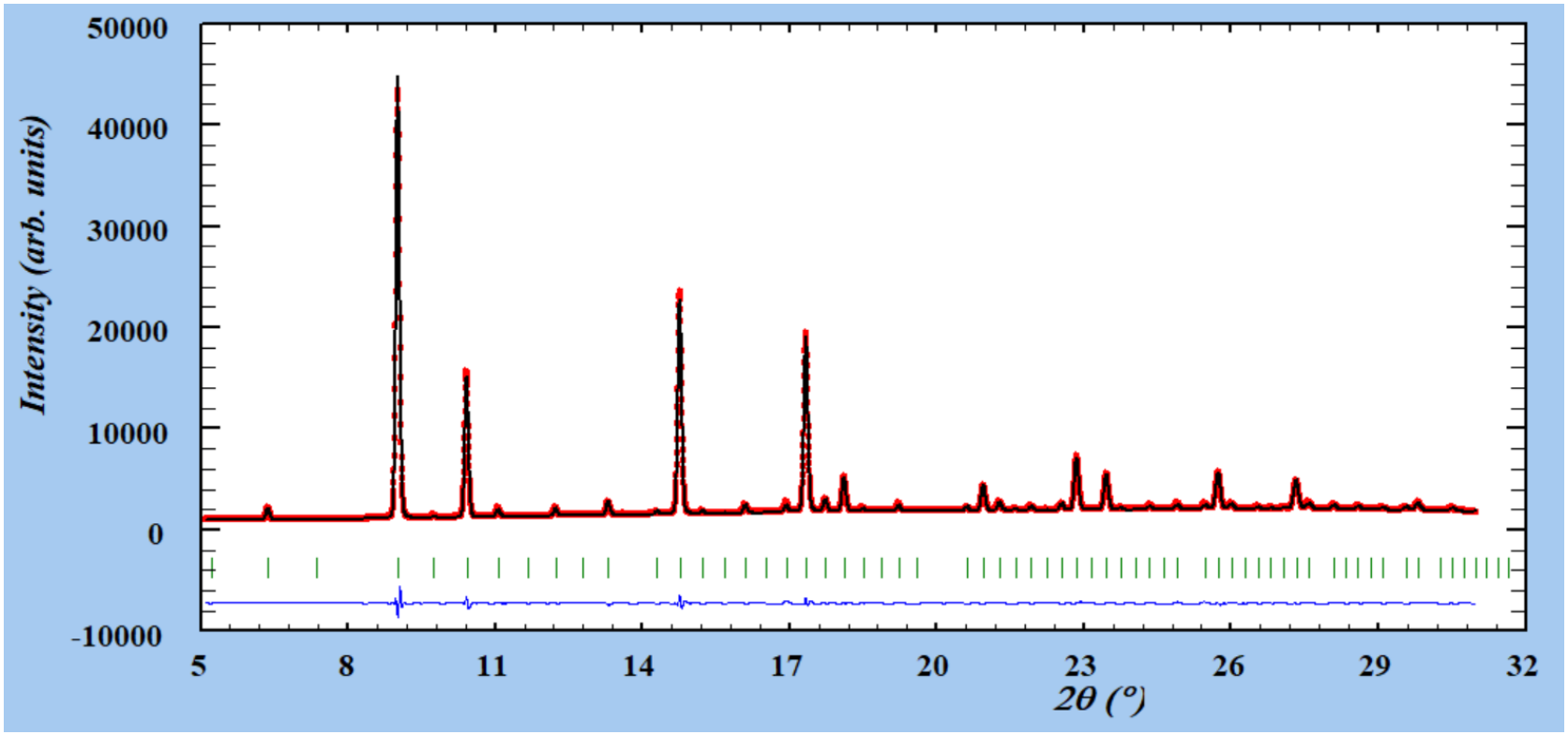

Figure S31 – Rietveld refinement plot for sample Sm60_0.74.

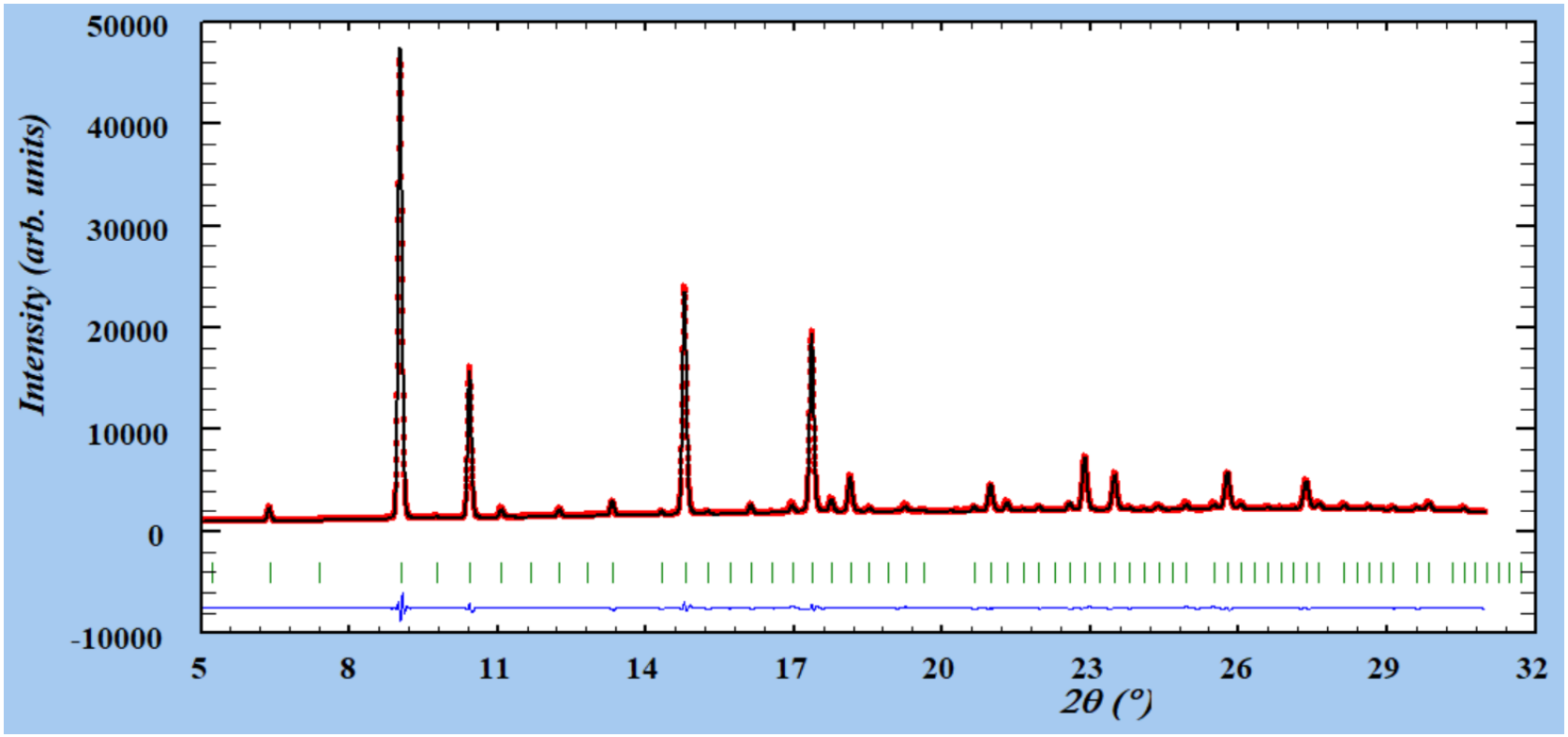

Figure S32 – Rietveld refinement plot for sample Sm60_1.58.

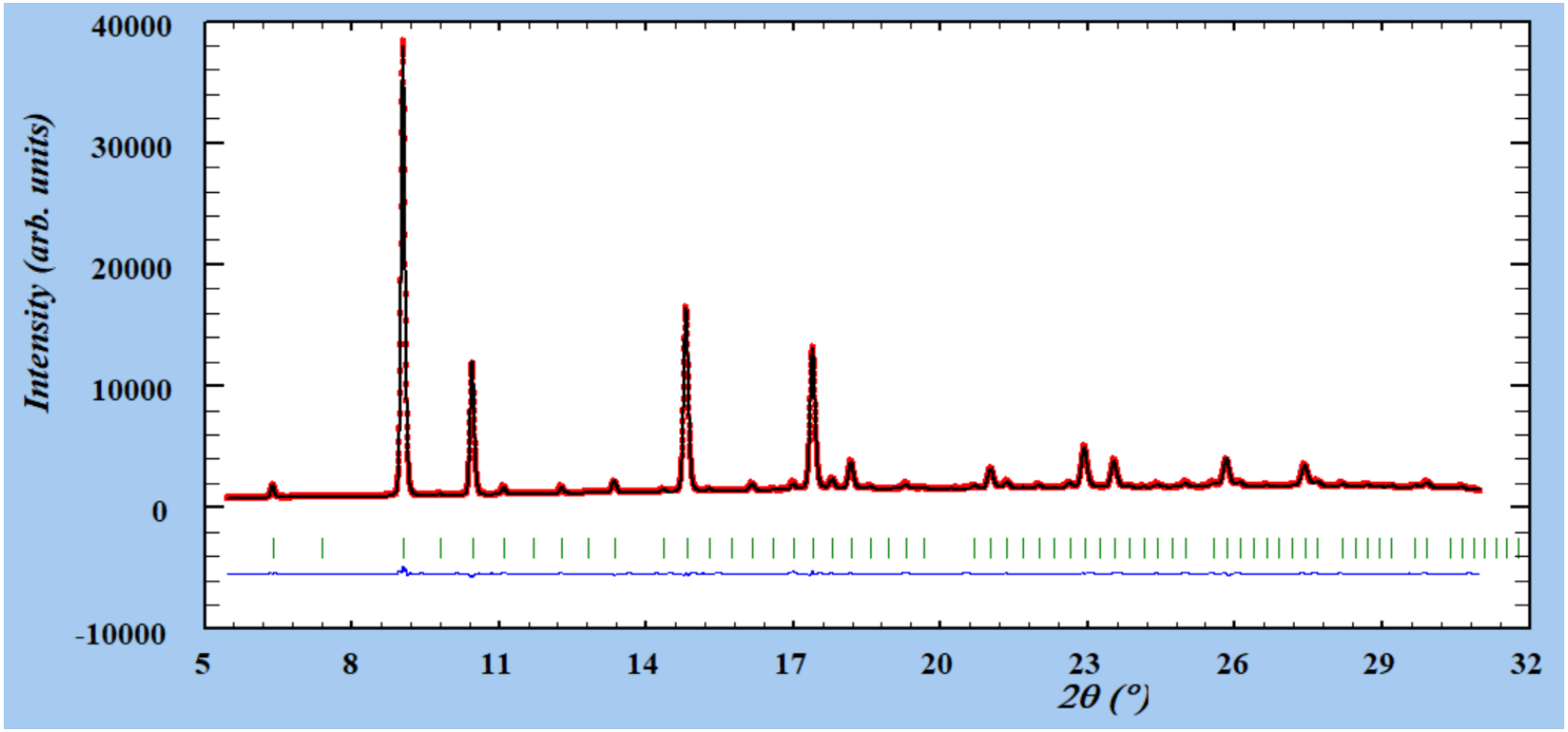

Figure S33 – Rietveld refinement plot for sample Sm60_2.98.

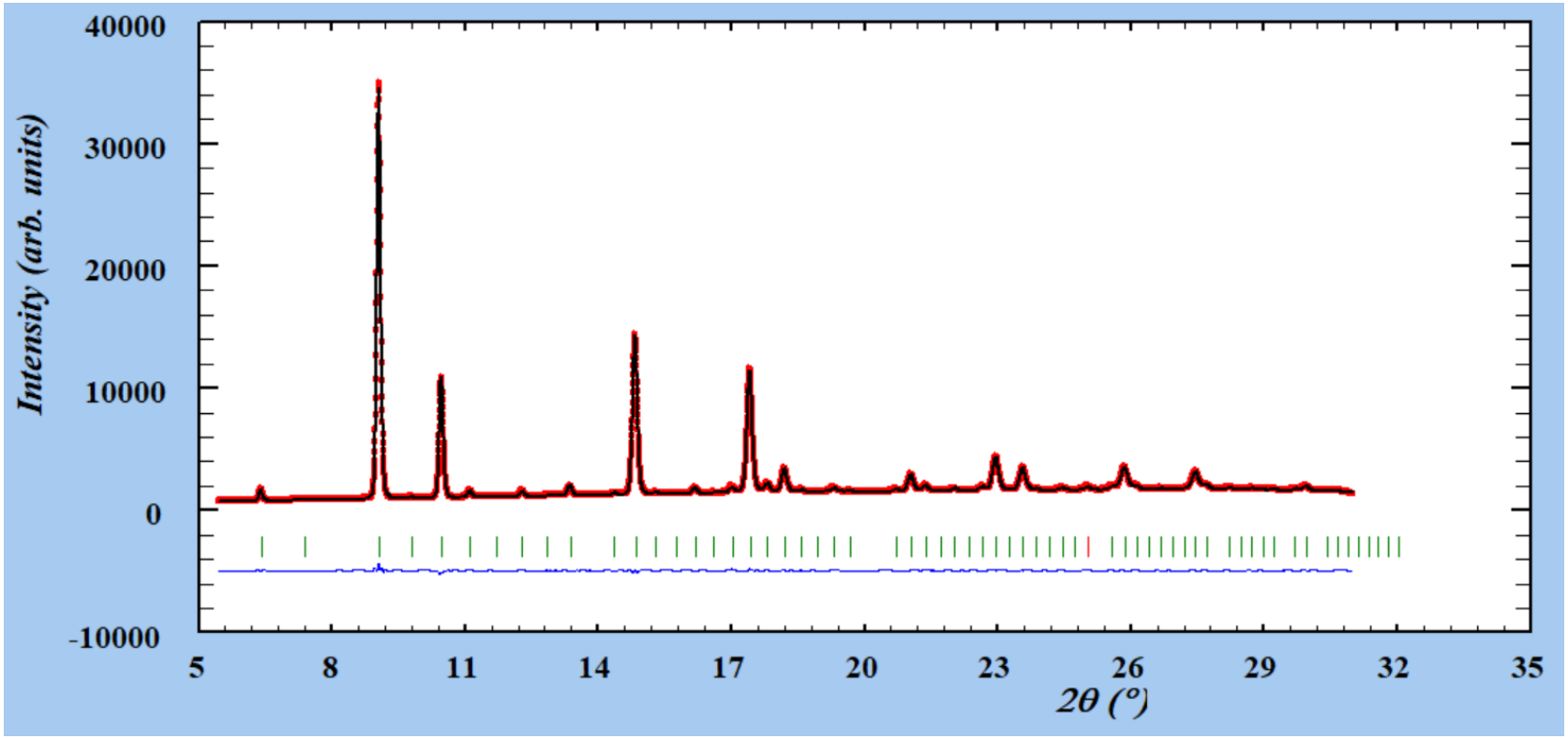

Figure S34 – Rietveld refinement plot for sample Sm60_4.11.

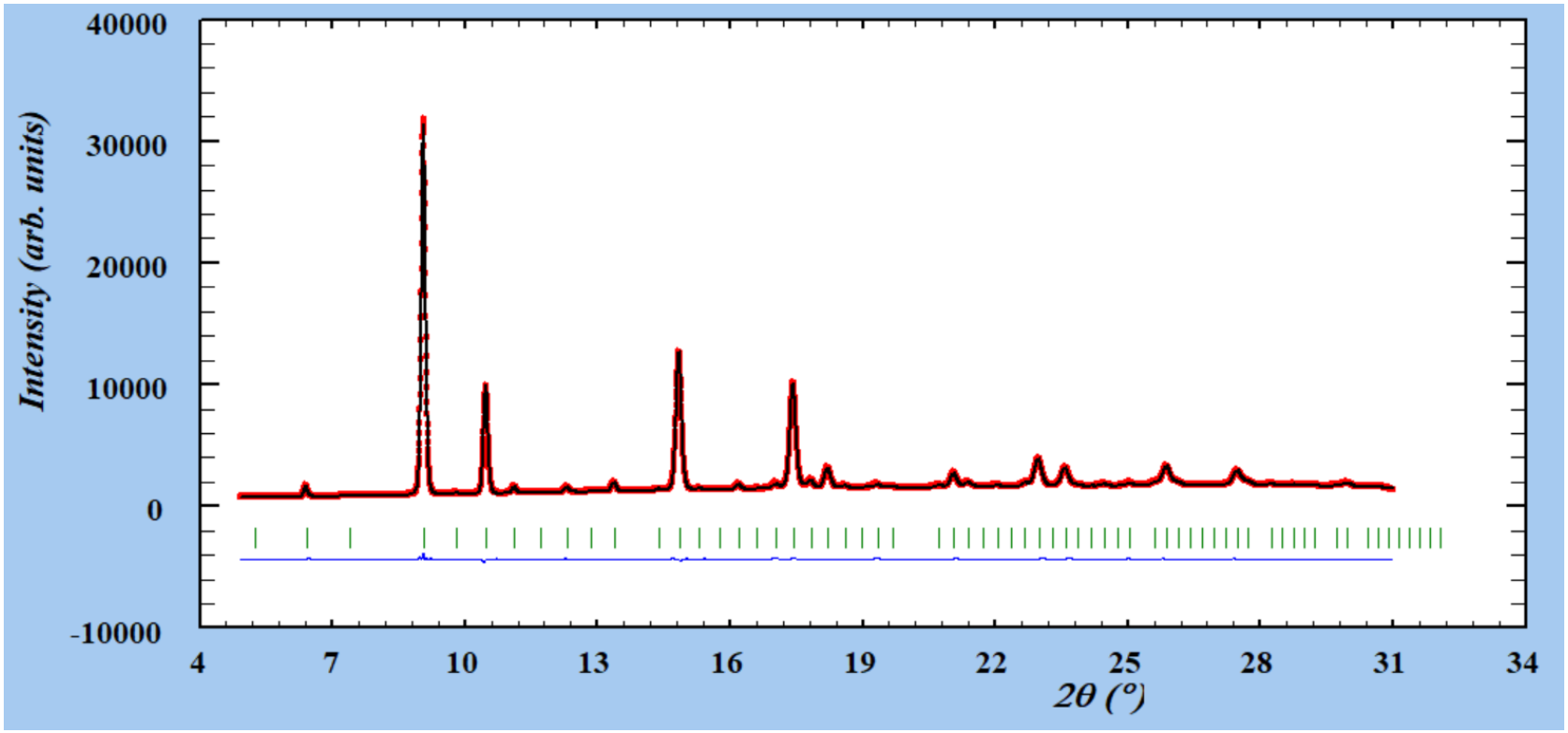

Figure S35 – Rietveld refinement plot for sample Sm60_4.86.

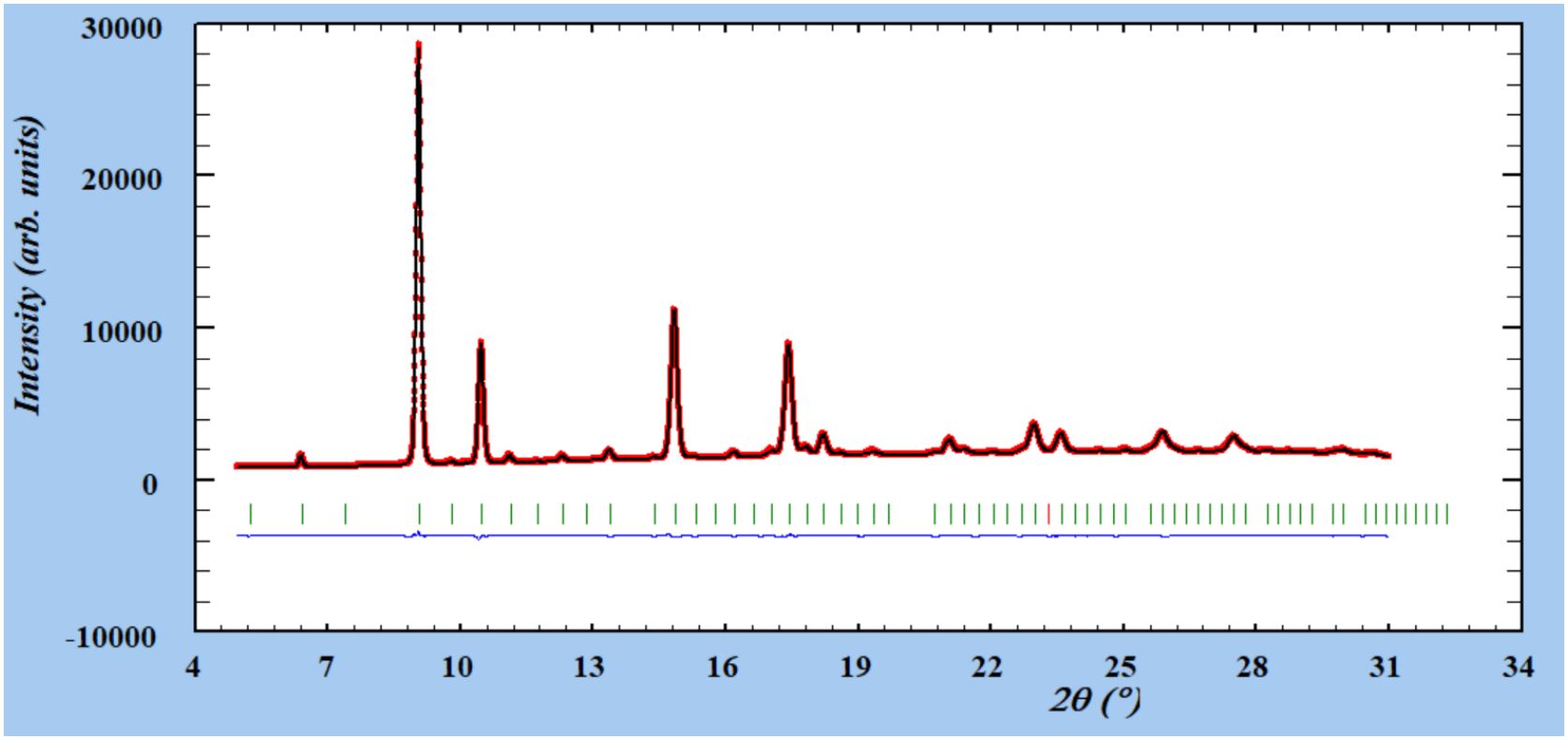

Figure S36– Rietveld refinement plot for sample Sm60_5.43.

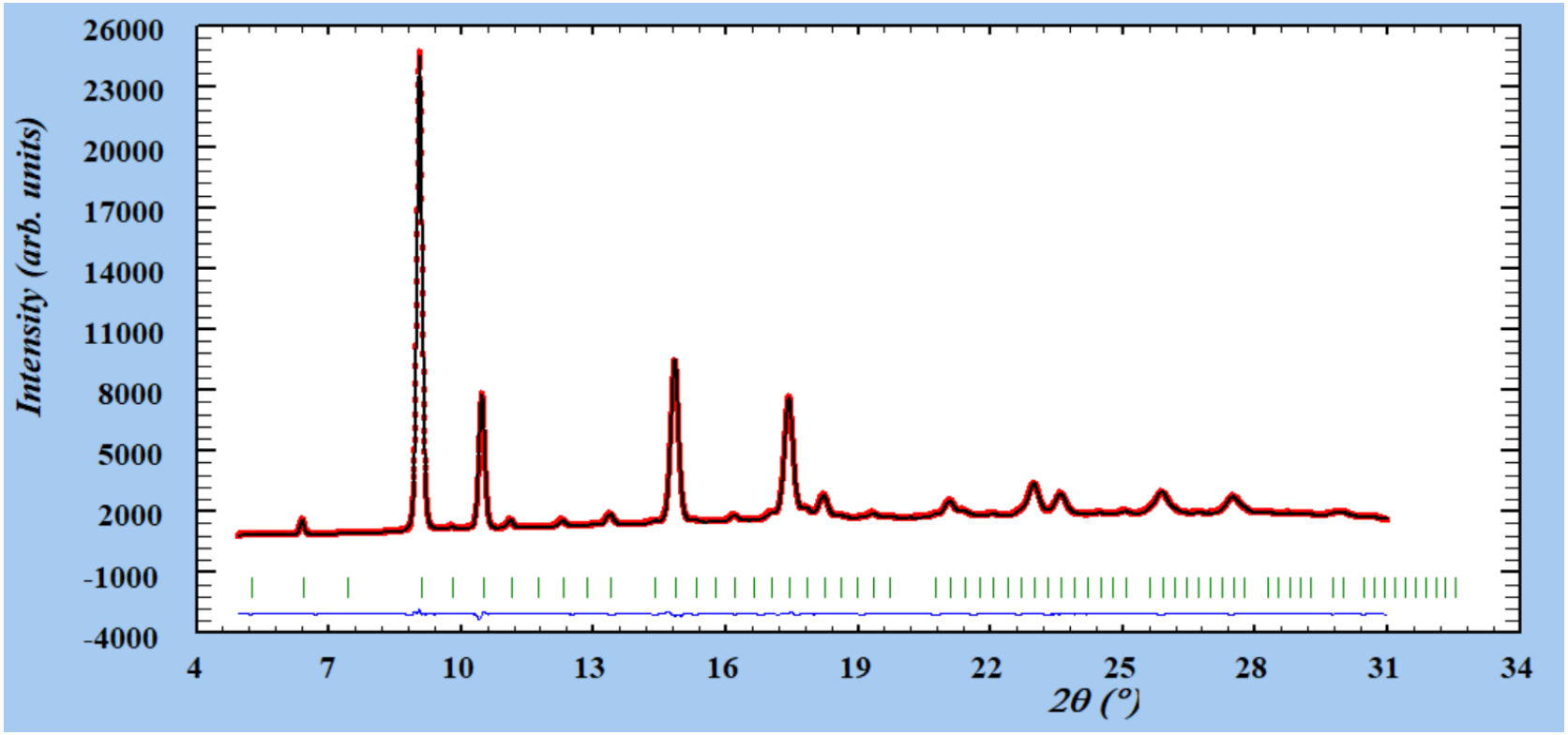

Figure S37– Rietveld refinement plot for sample Sm60_6.00.

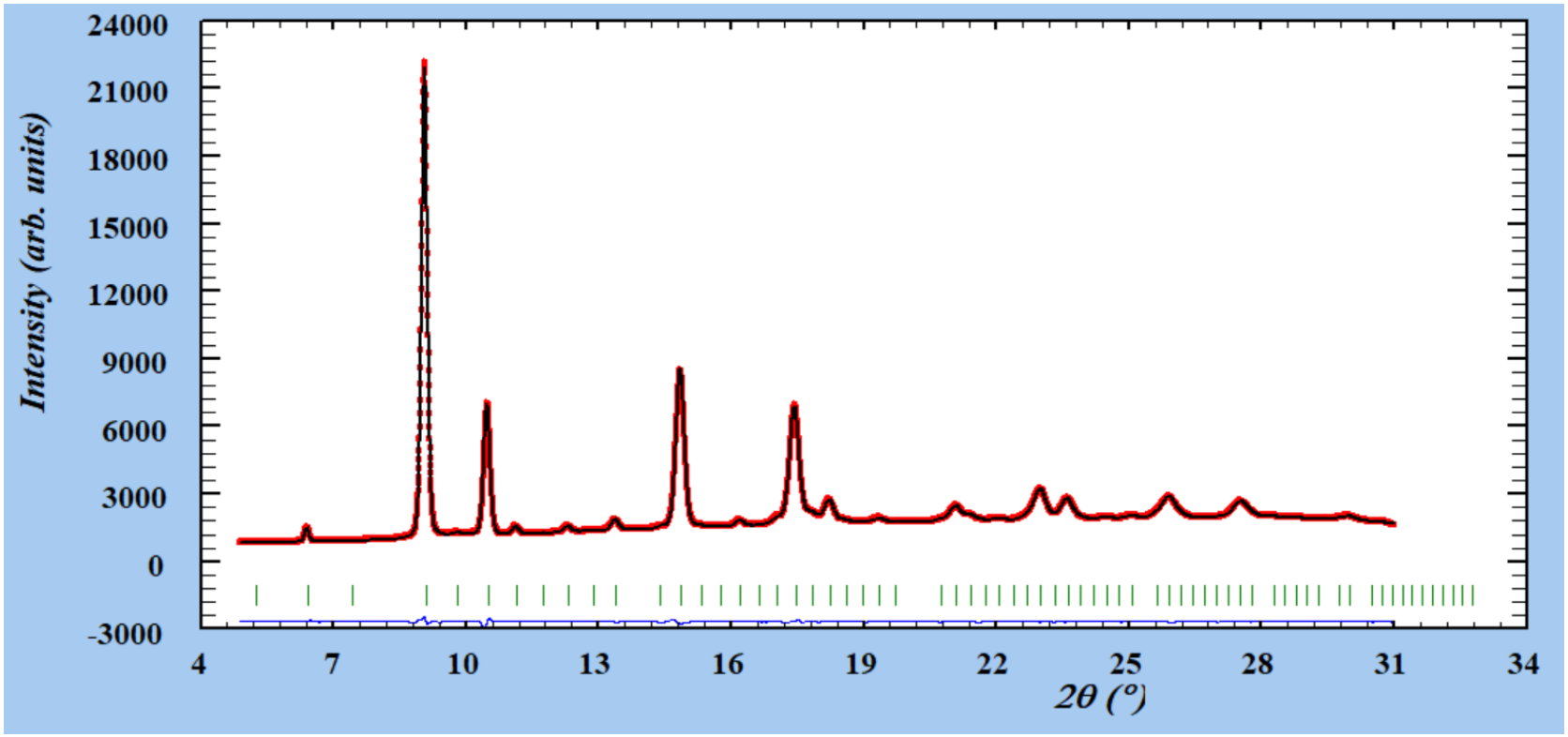

Figure S38– Rietveld refinement plot for sample Sm60_6.56.