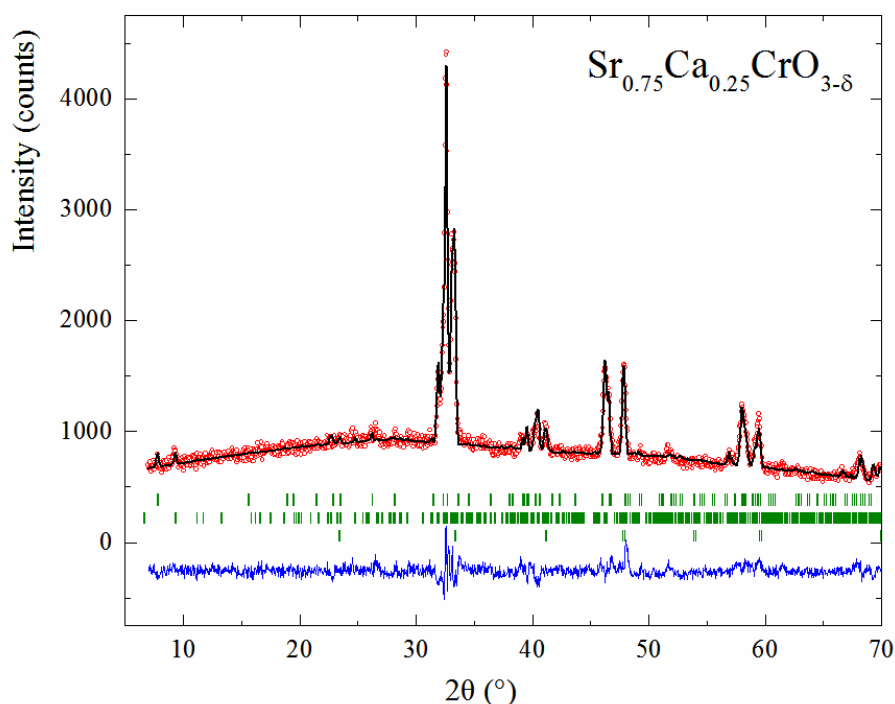


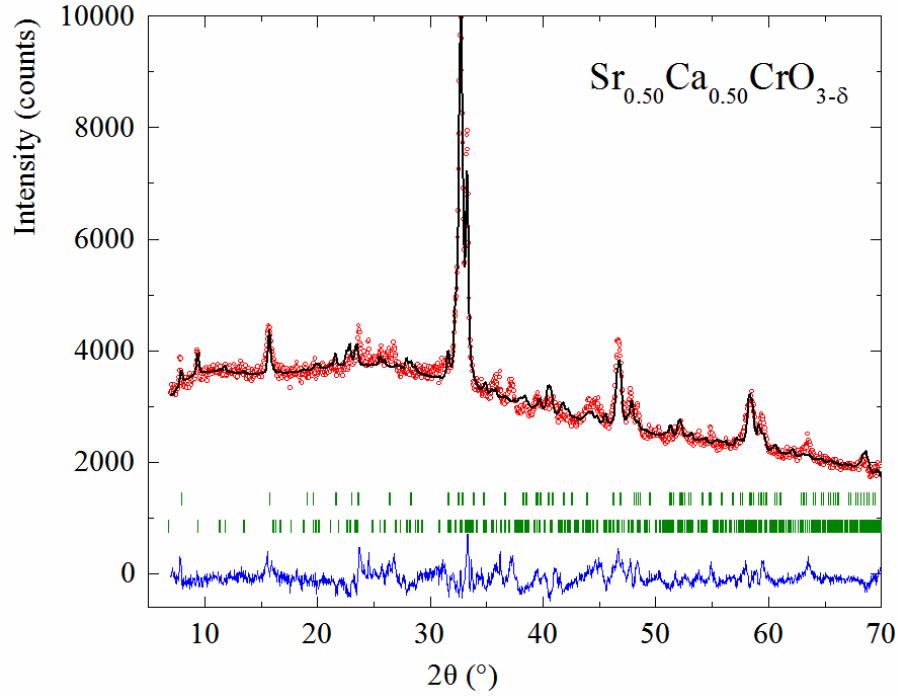
Supplementary Information; Rietveld Refinements for the 6H and 15R superstructure phases in the three $\text{Sr}_{1-x}\text{Ca}_x\text{CrO}_{3-\delta}$ samples are shown in Supp. Figures 1, 2 and 3. The space groups, agreement factors and lattice parameters are summarised in Supp. Tables 1, 2 and 3.



Supp. Figure 1: PXRd and 3-phase Rietveld refinement of $\text{Sr}_{0.75}\text{Ca}_{0.25}\text{CrO}_{3-\delta}$. Green vertical lines represent the $\text{Sr}_{0.75}\text{Ca}_{0.25}\text{CrO}_3$, 6H and 15R phases from top to the bottom respectively. The crystallographic information for the $\text{Sr}_{0.75}\text{Ca}_{0.25}\text{CrO}_3$, 6H and 15R phases were taken from published data.

Table 1: Space groups, agreement factors, lattice parameters, lattice volumes of $\text{Sr}_{0.75}\text{Ca}_{0.25}\text{CrO}_{3-\delta}$ phases.

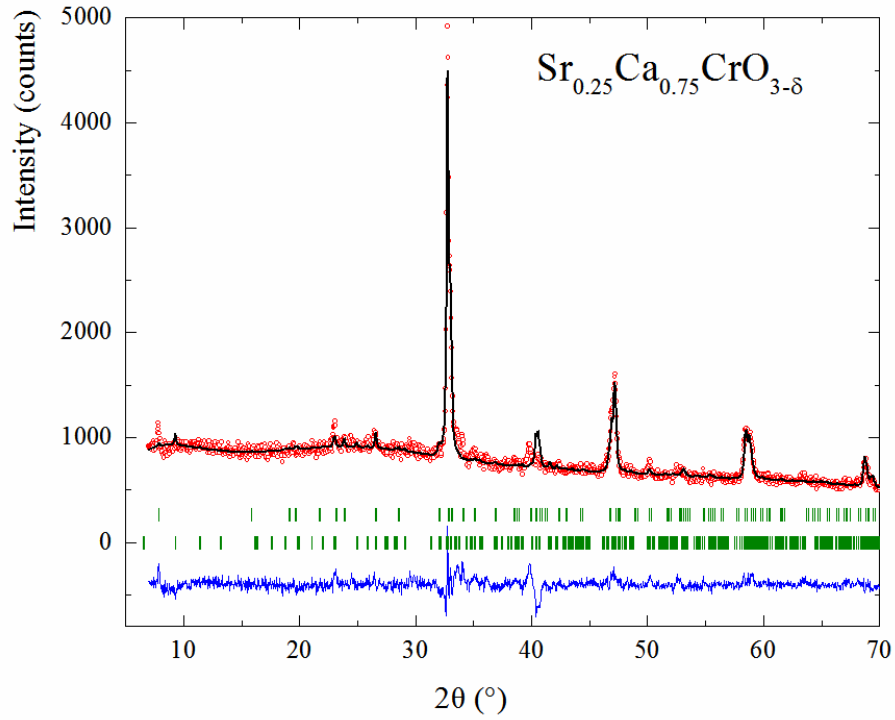
Sr _{0.75} Ca _{0.25} CrO _{3-δ}					
Superstructure phase	15R		Superstructure phase	6H	
Space group	<i>R</i> $\bar{3}$ <i>m</i>		Space group	<i>P</i> 2/ <i>m</i>	
Phase Composition	0.238(7)		Phase Composition	0.500(7)	
χ^2	2.153				
<i>R</i> _{wp}	0.050				
Lattice Parameters	Constants (Å)	Angles (°)	Lattice Parameters	Constants (Å)	Angles (°)
	<i>a</i> = 5.487(1)	α=90		<i>a</i> =9.540(2)	α=90
	<i>b</i> = 5.487(1)	β=90		<i>b</i> = 5.500(1)	β=92.78(1)
	<i>c</i> = 34.16(1)	γ=120		<i>c</i> = 13.423(2)	γ=90
Lattice Volume (Å ³)	890.7(4)		Lattice Volume (Å ³)	703.6(3)	



Supp. Figure 2: PXRD and 2-phase Rietveld refinement of $\text{Sr}_{0.50}\text{Ca}_{0.50}\text{CrO}_{3-\delta}$. The top green vertical lines represent the 6H phase and the bottom ones represent the 15R phase.

Table 3: Space groups, agreement factors, lattice parameters, lattice volumes of $\text{Sr}_{0.50}\text{Ca}_{0.50}\text{CrO}_{3-\delta}$ phases.

Sr _{0.50} Ca _{0.50} CrO _{3-δ}					
Superstructure phase	15R		Superstructure phase	6H	
Space Group	<i>R</i> $\bar{3}m$		Space Group	<i>P</i> 2/ <i>m</i>	
Phase Composition	0.21(1)		Phase Composition	0.79(1)	
χ^2	6.980				
<i>R</i> _{wp}	0.0480				
Lattice Parameters	Constants (<i>Å</i>)	Angles (°)	Lattice Parameters	Constants (<i>Å</i>)	Angles (°)
	a= 5.479(2)	α= 90		a= 9.551(4)	α=90
	b= 5.479(2)	β= 90		b= 5.490(2)	β=92.07(2)
	c= 33.89(3)	γ= 120		c=13.223(4)	γ=90
Lattice Volume (Å ³)	880.0(1)		Lattice Volume (Å ³)	698.2(6)	



Supp. Figure 3: PXRd and Rietveld refinement of $\text{Sr}_{0.25}\text{Ca}_{0.75}\text{CrO}_{3-\delta}$. The top green vertical lines represent the 6H phase and the bottom ones represent the 15R phase.

Table 3: Space groups, agreement factors, lattice parameters, lattice volumes of $\text{Sr}_{0.25}\text{Ca}_{0.75}\text{CrO}_{3-\delta}$ phases.

Sr _{0.25} Ca _{0.75} CrO _{3-δ}					
Superstructure phase	15R		Superstructure phase	6H	
Space Group	<i>R</i> $\bar{3}$ <i>m</i>		Space Group	<i>P</i> 2/ <i>m</i>	
Phase Composition	0.17(1)		Phase Composition	0.83(1)	
χ^2	2.787				
R _{wp}	0.0591				
Lattice Parameters	Constants (Å)	Angles (°)	Lattice Parameters	Constants (Å)	Angles (°)
	a=5.406(2)	α=90		a=9.465(3)	α=90
	b=5.406(2)	β=90		b=5.419(1)	β=89.914(2)
	c=33.50(2)	γ=120		c=13.394(4)	γ=90
Lattice Volume (Å ³)	847.7(7)		Lattice Volume (Å ³)	688.3(7)	