

Fabrication and characterization of composite Ni-SDC fuel cell cathode reinforced by Ni foam

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Table S1. Crystal and Refinement parameters for all measured composite materials. Estimated standard deviations are given in parentheses.

Sample	Ni 100%	
Chemical formula	Ni	-
Crystal system	Cubic	-
Space group	<i>Fm-3m</i>	-
Unit cell dimensions (Å)	$a = 3.525553(8)$	-
Volume (Å ³)	43.821(1)	-
Weight fraction (%)	100	-
Density (g cm ⁻³)	8.897	-
R-factors	Phase residuals	
	R _F =0.0167	-
	Total	
	R _{wp} =0.0249	
Sample	Ni 80%, SDC 20%	
Chemical formula	Ni	Ce _{0.8} Sm _{0.2} O _{1.9}
Crystal system	Cubic	Cubic
Space group	<i>Fm-3m</i>	<i>Fm-3m</i>
Unit cell dimensions (Å)	$a = 3.52395(1)$	$a = 5.4585(1)$
Volume (Å ³)	43.761(1)	162.64(1)
Weight fraction (%)	82.65(7)	17.3(2)

Density (g cm ⁻³)	8.909	7.047
R-factors	Phase residuals	
	R _F =0.0067	R _F =0.0495
	Total	
	R _{wp} =0.0203	

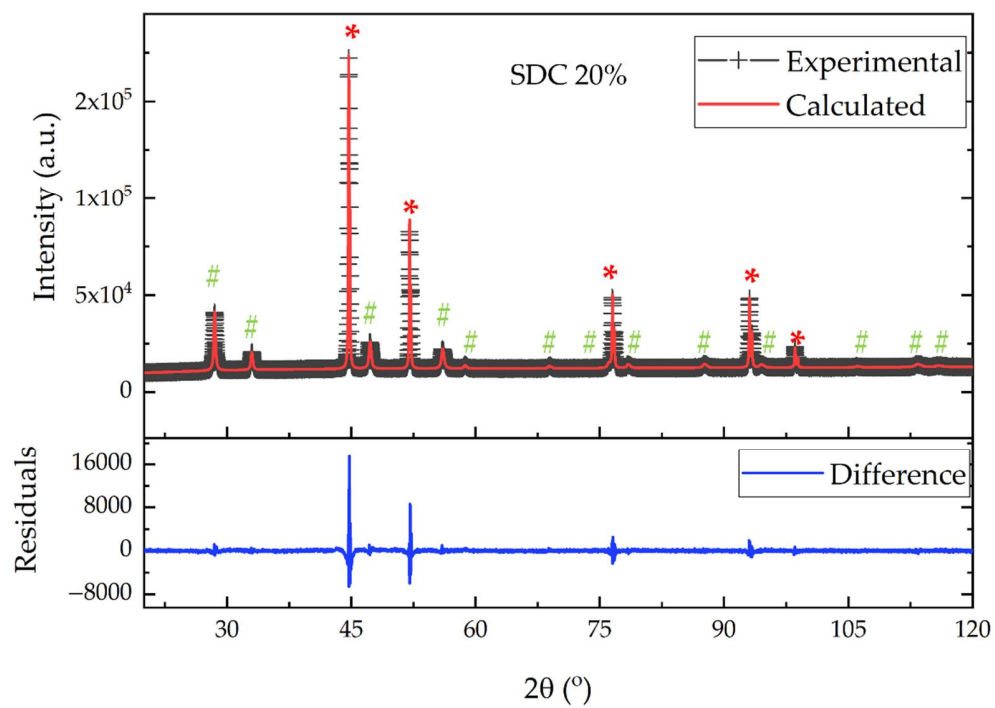
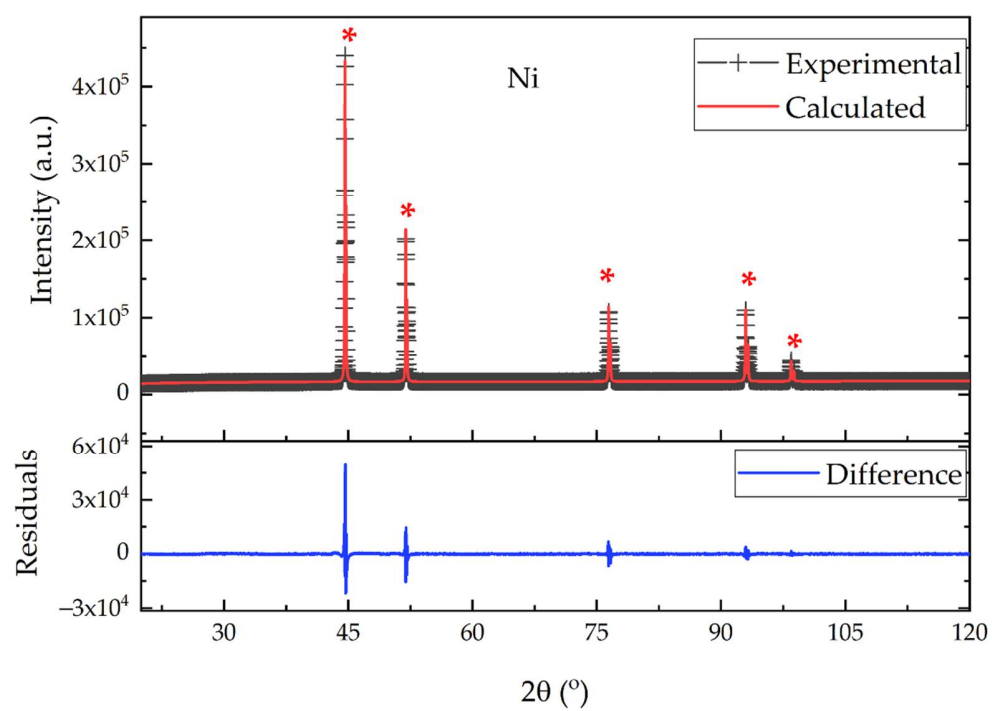
Sample	Ni 60%, SDC 40%	
Chemical formula	Ni	Ce _{0.8} Sm _{0.2} O _{1.9}
Crystal system	Cubic	Cubic
Space group	<i>Fm-3m</i>	<i>Fm-3m</i>
Unit cell dimensions (Å)	<i>a</i> = 3.52449(1)	<i>a</i> = 5.45852(9)
Volume (Å ³)	43.781(1)	162.639(8)
Weight fraction (%)	66.61(15)	33.3(4)
Density (g cm ⁻³)	8.905	7.047
R-factors	Phase residuals	
	R _F =0.0086	R _F =0.0663
	Total	
	R _{wp} =0.0242	

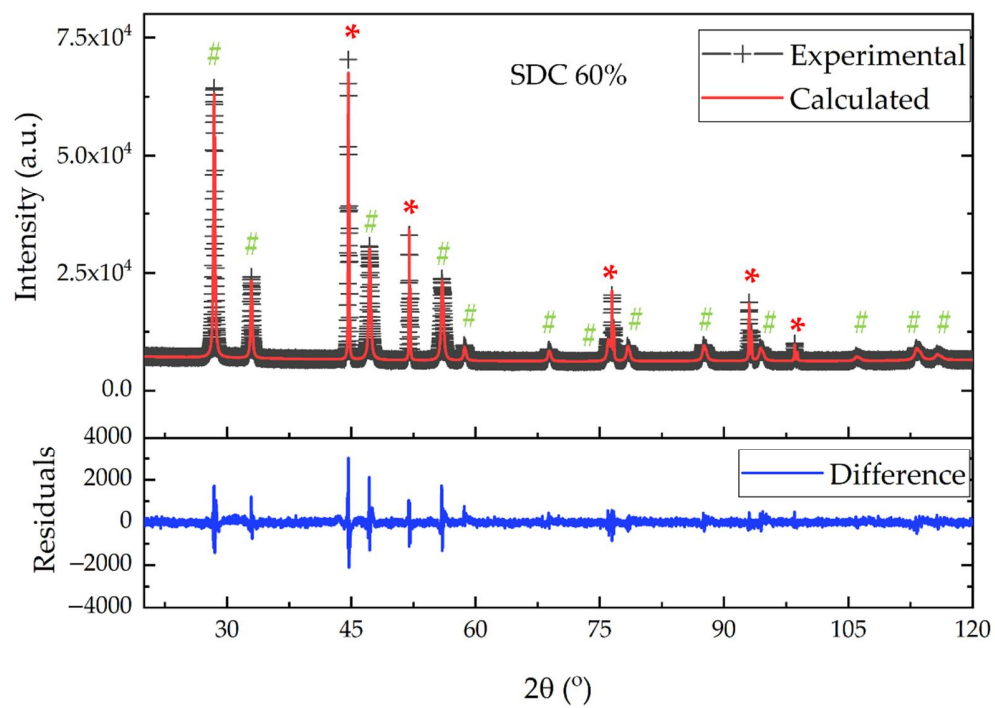
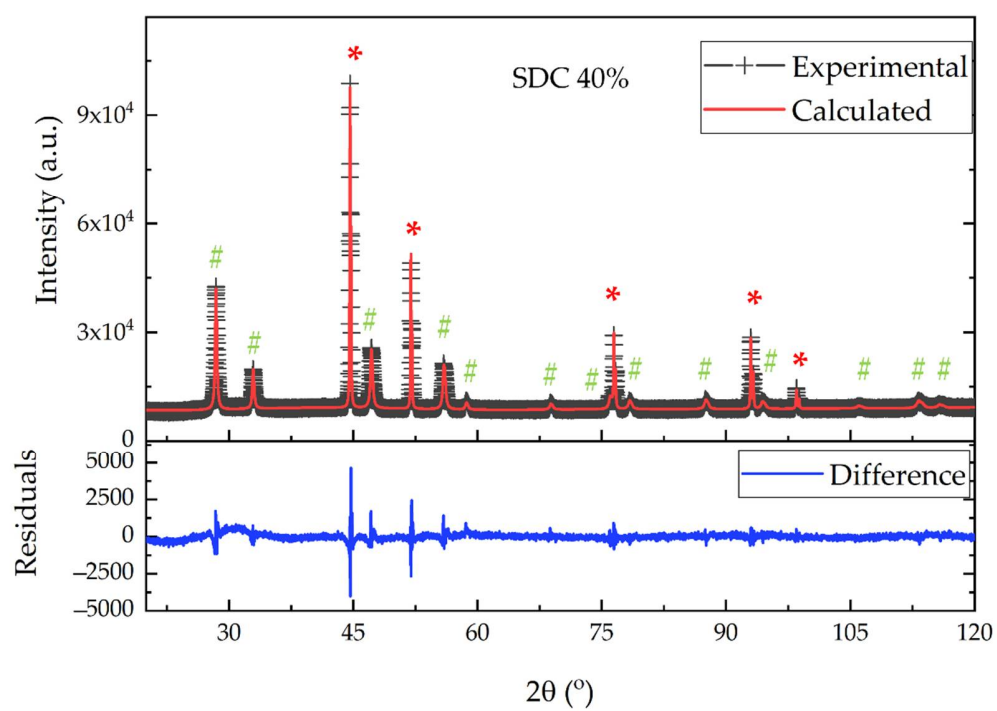
Sample	Ni 50%, SDC 50%	
Chemical formula	Ni	Ce _{0.8} Sm _{0.2} O _{1.9}
Crystal system	Cubic	Cubic
Space group	<i>Fm-3m</i>	<i>Fm-3m</i>
Unit cell dimensions (Å)	<i>a</i> = 3.52425(1)	<i>a</i> = 5.45852(6)
Volume (Å ³)	43.772(1)	162.639(5)
Weight fraction (%)	56.86(16)	43.13(47)
Density (g cm ⁻³)	8.907	7.047
R-factors	Phase residuals	
	R _F =0.015	R _F =0.0371
	Total	
	R _{wp} =0.0200	

Sample	Ni 40%, SDC 60%	
Chemical formula	Ni	Ce _{0.8} Sm _{0.2} O _{1.9}

Crystal system	Cubic	Cubic
Space group	<i>Fm-3m</i>	<i>Fm-3m</i>
Unit cell dimensions (Å)	<i>a</i> = 3.52423(1)	<i>a</i> = 5.45944(4)
Volume (Å ³)	43.772(1)	162.722(4)
Weight fraction (%)	46.13(16)	53.86(47)
Density (g cm ⁻³)	8.907	7.044
R-factors	Phase residuals	
	R _F =0.0070	R _F =0.0236
	Total	
	R _{wp} =0.0176	

Sample	SDC 100%	
Chemical formula	-	Ce _{0.8} Sm _{0.2} O _{1.9}
Crystal system	-	Cubic
Space group	-	<i>Fm-3m</i>
Unit cell dimensions (Å)	-	<i>a</i> = 5.45816(17)
Volume (Å ³)	-	162.607(16)
Weight fraction (%)	-	100
Density (g cm ⁻³)	-	7.049
R-factors	Phase residuals	
	-	R _F =0.0252
	Total	
	R _{wp} =0.0577	





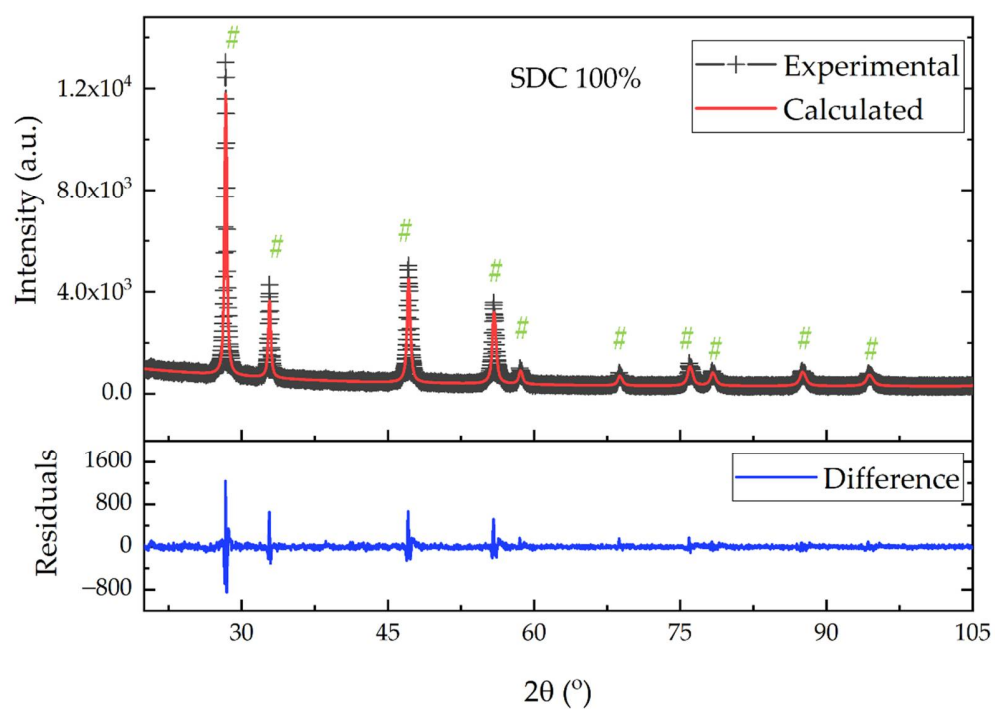


Figure S1. Fitted X-ray diffraction profiles for composite materials. Observed (+ black symbols), calculated (red line), and difference (blue line, lower) profiles are shown. Reflection positions of Ni and SDC phases are indicated by red "*" and green "#" symbols, respectively.