Supporting Information for "Optical Phonon Modes and Dielectric Behavior of $Sr_{1-3x/2}Ce_xTiO_3$ Microwave Ceramics", by R.L. Moreira *et al.* (2007)

Tables – Fitting parameters obtained by using the four-parameter semi-quantum model [1] for the infrared reflectivity spectra of $Sr_{1-3x/2}Ce_xTiO_3$ ceramics and $SrTiO_3$ single crystal. Frequencies (Ω) and widths (γ) are in cm^{-1}. $\Delta\varepsilon$ and $\Delta\eta$ measure, respectively, the amplitude of each TO and LO branch.

$SrTiO_3$ (single crystal)

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
92.396	14.017	171.032	4.519	286.108489	0.000295
173.941	6.714	474.993	5.496	3.673827	0.030790
545.028	17.786	795.814	24.950	1.532589	0.149115
	ε_∞ = 5.448			ε_0 = 297	

x = 0.133

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
112.766	24.190	175.238	12.000	158.026690	0.000566
180.970	12.928	471.181	8.656	6.537339	0.037300
549.902	21.274	780.379	26.462	1.472287	0.148834
	ε_∞ = 5.194			ε_0 = 171	

x = 0.143

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
115.313	27.745	175.855	14.000	146.966876	0.000635
182.366	15.196	471.181	8.925	7.297565	0.037869
550.794	21.931	779.435	26.948	1.467924	0.148498
	ε_∞ = 5.176			ε_0 = 161	

x = 0.154

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
114.585	34.918	175.955	17.000	143.283656	0.000742
183.274	19.236	471.326	9.733	7.741426	0.038468
549.782	22.726	778.164	28.597	1.415062	0.152829
	ε_∞ = 5.041			ε_0 = 157	

x = 0.167

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
118.301	34.561	175.212	17.000	132.315721	0.000763
183.265	20.346	471.292	9.952	8.951070	0.038309
550.604	21.926	776.927	28.447	1.436789	0.149560
	ε_∞ = 5.118			ε_0 = 148	

x = 0.182

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
119.735	32.586	176.071	16.000	130.420782	0.000743
184.057	18.599	471.390	10.475	8.948010	0.037905
550.664	21.611	776.012	29.863	1.448517	0.147433
	ε_∞ = 5.183			ε_0 = 146	

x = 0.200

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
121.583	38.019	177.186	19.000	120.700462	0.000844
186.055	22.280	471.510	11.184	9.377360	0.039132
551.325	22.743	774.251	29.828	1.410006	0.149681
	ε_∞ = 5.077			ε_0 = 137	

x = 0.222

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
124.687	32.928	176.277	16.000	115.310675	0.000755
184.834	19.569	471.648	11.996	9.833714	0.038661
551.412	22.969	772.956	32.097	1.421909	0.147143
	ε_∞ = 5.151			ε_0 = 132	

x = 0.250

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
127.110	33.251	180.556	17.000	108.004461	0.000844
189.555	18.091	471.923	13.165	9.222710	0.039772
552.285	23.078	770.736	32.884	1.388069	0.148211
	ε_∞ = 5.078			ε_0 = 124	

x = 0.286

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
128.090	39.507	179.823	20.000	101.854744	0.000904
189.471	22.829	472.575	17.845	9.772044	0.040532
551.827	28.100	768.512	41.813	1.330195	0.151754
	ε_∞ = 4.959			ε_0 = 118	

x = 0.333

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
131.549	32.977	178.273	16.000	96.664487	0.000798
187.743	19.402	473.445	15.911	10.713089	0.040422
552.917	25.020	761.697	33.564	1.320746	0.144701
	ε_∞ = 5.136			ε_0 = 114	

x = 0.400

Ω_{TO}	γ_{TO}	Ω_{LO}	γ_{LO}	$\Delta\varepsilon$	$\Delta\eta$
139.823	34.670	177.424	17.000	76.315460	0.000829
189.061	22.740	475.827	21.354	14.156426	0.040023
551.894	27.095	756.196	39.761	1.235329	0.146701
	ε_∞ = 5.053			ε_0 = 97	

[1] Gervais, F.; Echegut, P., in *Incommensurate phases in dielectrics*; Blinc, R., Levanyuk, A. P., Eds.; North-Holland: Amsterdam, 1986; p 337.

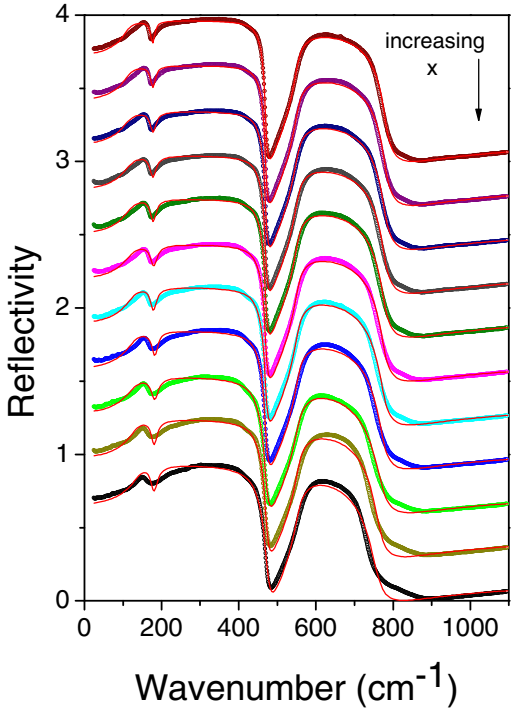

Figure S1. Infrared reflectivity spectra (circles) with their corresponding fitting (solid curves) by the four-parameter semi-quantum model, for $Sr_{1-3x/2}Ce_xTiO_3$ ceramics. The spectra were vertically shifted for clarity. The fittings were done using the three cubic phonon modes.

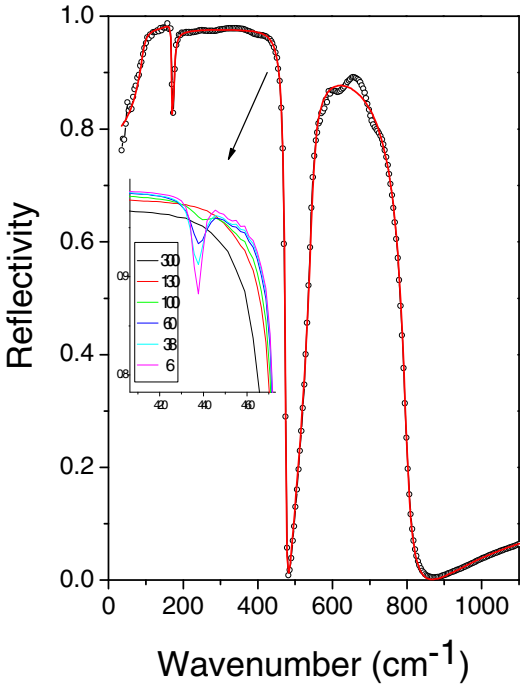

Figure S2. Experimental (circles) and adjusted (solid red line) infrared spectra of a ST single crystal. The inset shows a zoom of low-temperature spectra around the dip appearing below 120K (at the cubic-to-tetragonal transition).

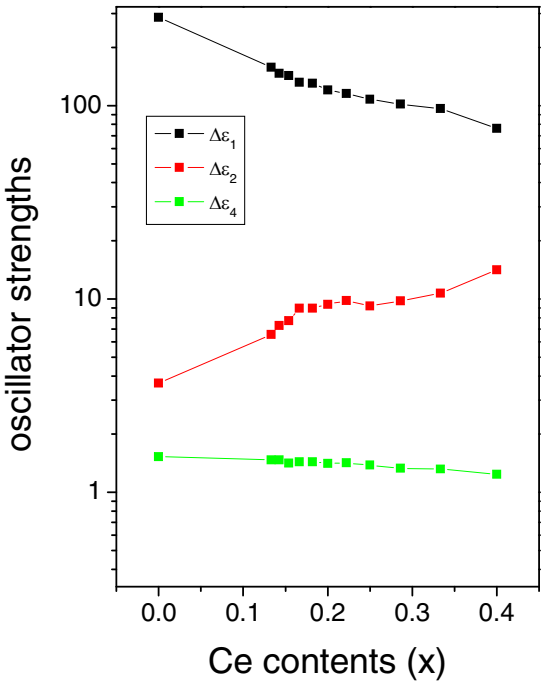

Figure S3. Ce-contents exponential dependences of the oscillator strengths ($\Delta\varepsilon$) of the three adjusted modes for the $Sr_{1-3x/2}Ce_xTiO_3$ (SCT) ceramics and ST single crystal.

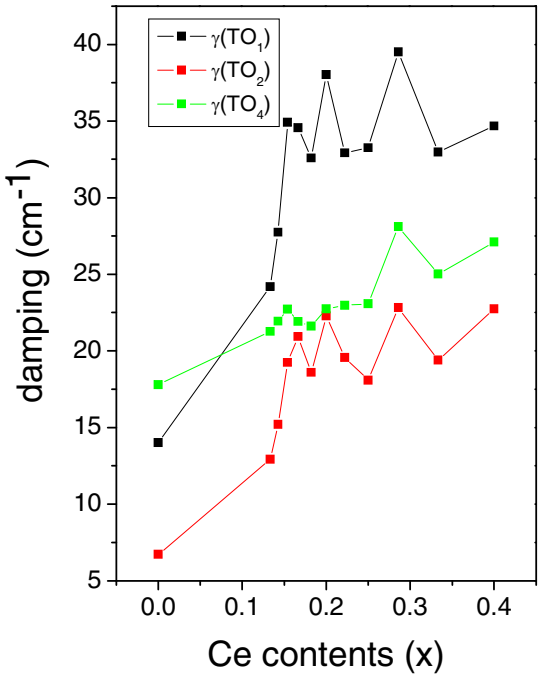

Figure S4. Increasing of the adjusted transverse-mode phonon widths of the SCT ceramics and ST single crystal with x. Note the large fluctuations (low accuracy) of the damping values because of using only three modes for the fittings.