

Supporting information

Cr³⁺-Doped CaMgGe₂O₆ Phosphors: Crystal Field Effects and the Synergistic Role of FIR and Fluorescence Lifetime in Multi-Mode Optical Thermometry

Yosra Bahrouni ^(a), Ikhlas Kachou ^(a), Kamel Saidi ^(a,b), Christian Hernández-Álvarez ^(c,d),
Mohamed Dammak ^(a), Inocencio R Martín ^(c).

(a) Laboratoire de Physique Appliquée, Faculté des Sciences de Sfax, Département de Physique, Université de Sfax, BP 1171 Sfax, Tunisia

(b) Department of physics, Sfax Preparatory Engineering Institute, University of Sfax, 1172 - 3000 Sfax. Tunisia

(c) Universidad de La Laguna, Departamento de Física, MALTA-Consolider Team, IMN and IUdEA Apdo. Correos 456, E-38206, San Cristóbal de La Laguna, Santa Cruz de Tenerife, Spain.

(d) Adam Mickiewicz University, Faculty of Chemistry, Uniwersytetu Poznańskiego 8, 61-614 Poznań, Poland.

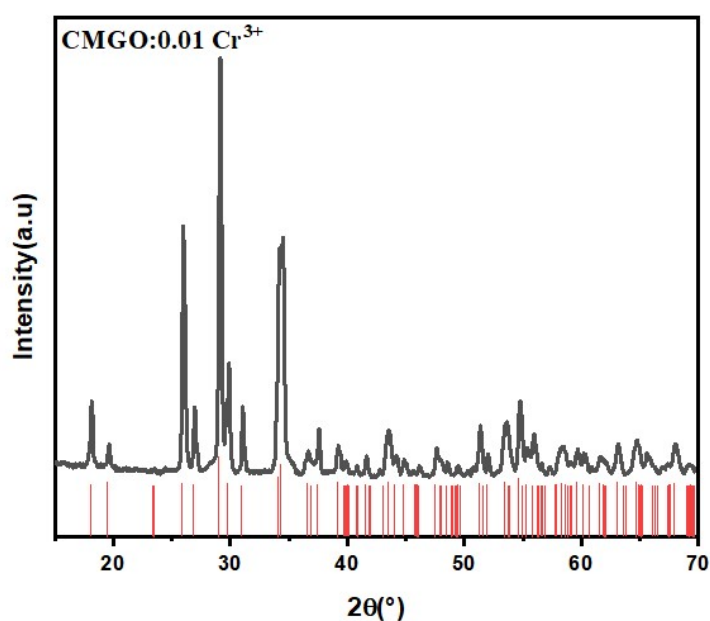


Figure S1. XRD patterns of the CMGO: 0.01 Cr³⁺.

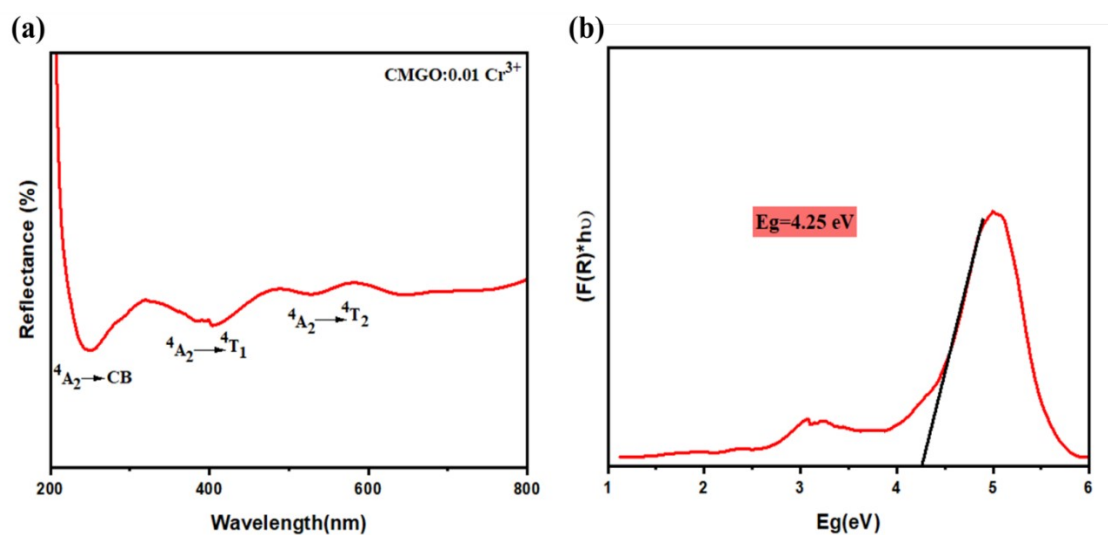


Figure S2. a) Diffuse reflectance spectra. b) Kubelka-Munk plot for estimating the optical band gap energy of CMGO: 0.01 Cr³⁺ sample.

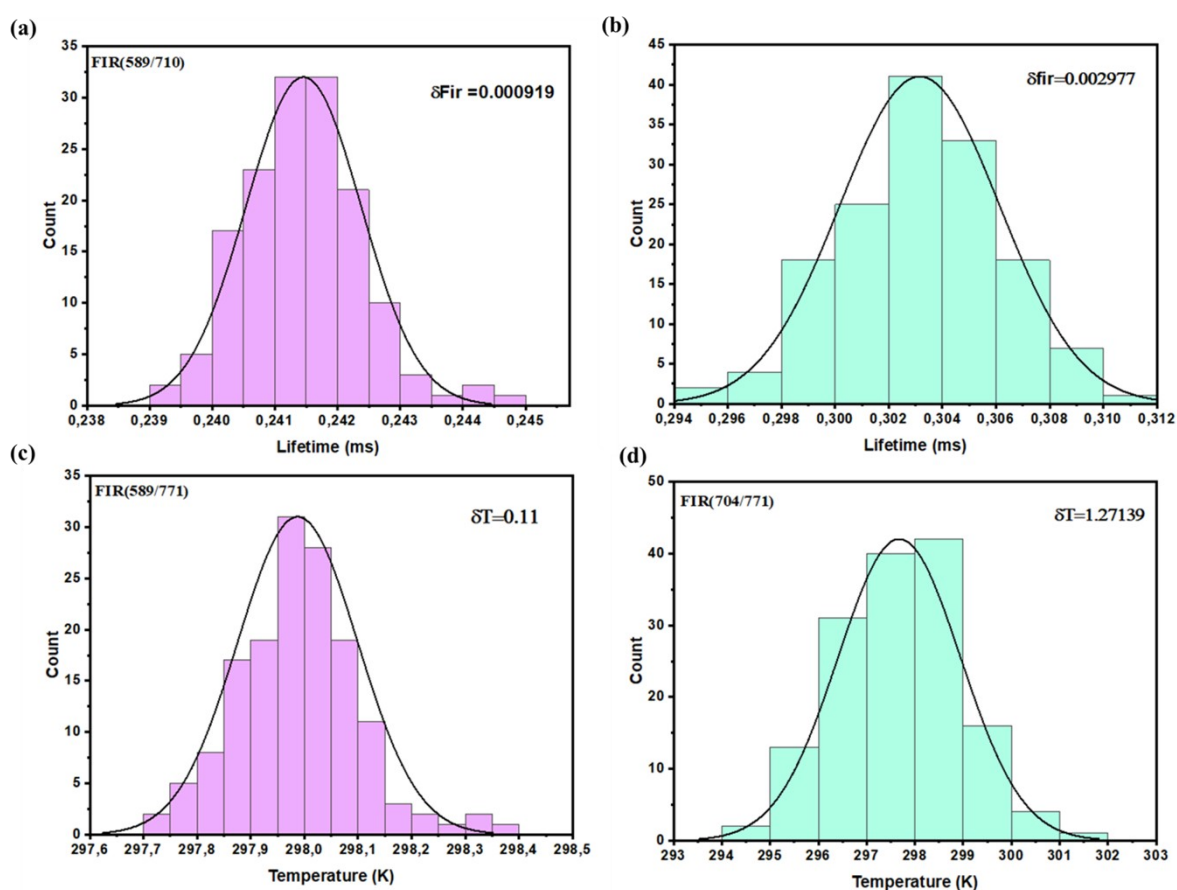


Figure S3. Temperature resolutions (δT) for (a) FIR (589/771 nm) and (b) FIR (704/771 nm) as a function of temperature.

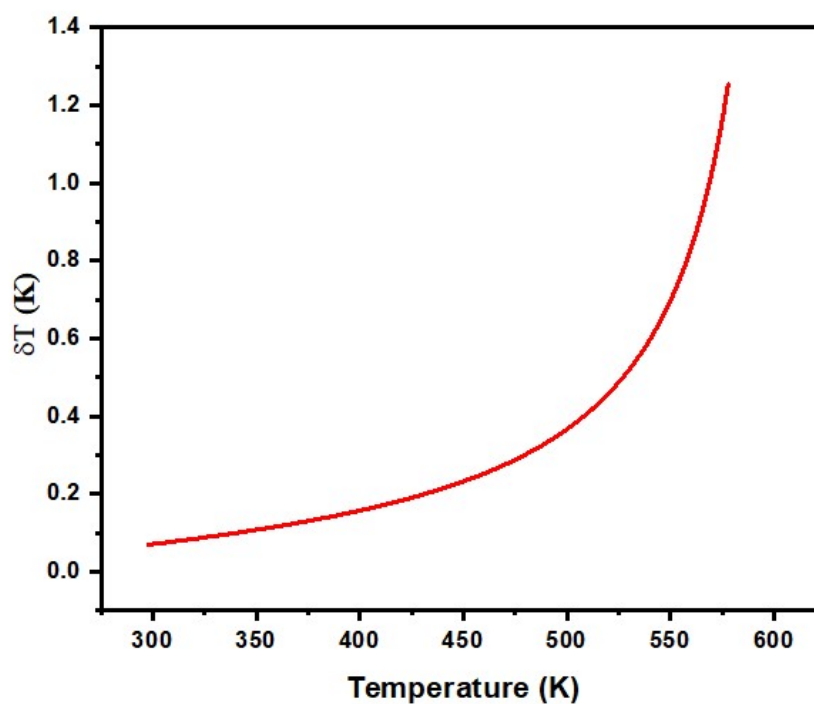


Figure S4. Temperature resolutions (δT) for CMGO: 0.01 Cr³⁺ as a function of temperature.

Table S1. Crystallographic data for CMGO: 0.01 Cr³⁺ as obtained from Rietveld refinement.

Parameters	Sample
Crystal system	Monoclinic
Space group	C12/c
Cell parameters	$a=10.1659 \text{ \AA}$ $b=9.0096 \text{ \AA}$ $c=5.4369 \text{ \AA}$ $\alpha=90^\circ$ $\beta=105.181^\circ$ $\delta=90^\circ$
R_{wp}	17.1 %
Z	4
χ^2	1.5
Volume ($\text{\AA}^3$)	234.5