Supporting Information

Tuning from Nanoparticles to Nanorods: Experimental and Theoretical Investigation of La-Doped CdTe for Enhanced Photoresponse

S. Supriya[1], A. S. Agrawal[1], J. Kumar[2,3], D. Alagarasan[4], R. Naik[1*]

[1] *Department of Engineering and Materials Physics, Institute of Chemical Technology-Indian Oil Odisha Campus, Bhubaneswar, 751013, India*

[2]*Department of Physics and Astrophysics, University of Delhi, Delhi-110007, India*

[3]*Department of Physics, Centre of Excellence in High Energy and Condensed Matter Physics, Utkal University, Bhubaneswar 751004, India*

[4]*Department of Physics, Nitte Meenakshi Institute of Technology (NMIT), Nitte (Deemed to be University), Bengaluru, 560064, India*

**Corresponding author: ramakanta.naik@gmail.com*

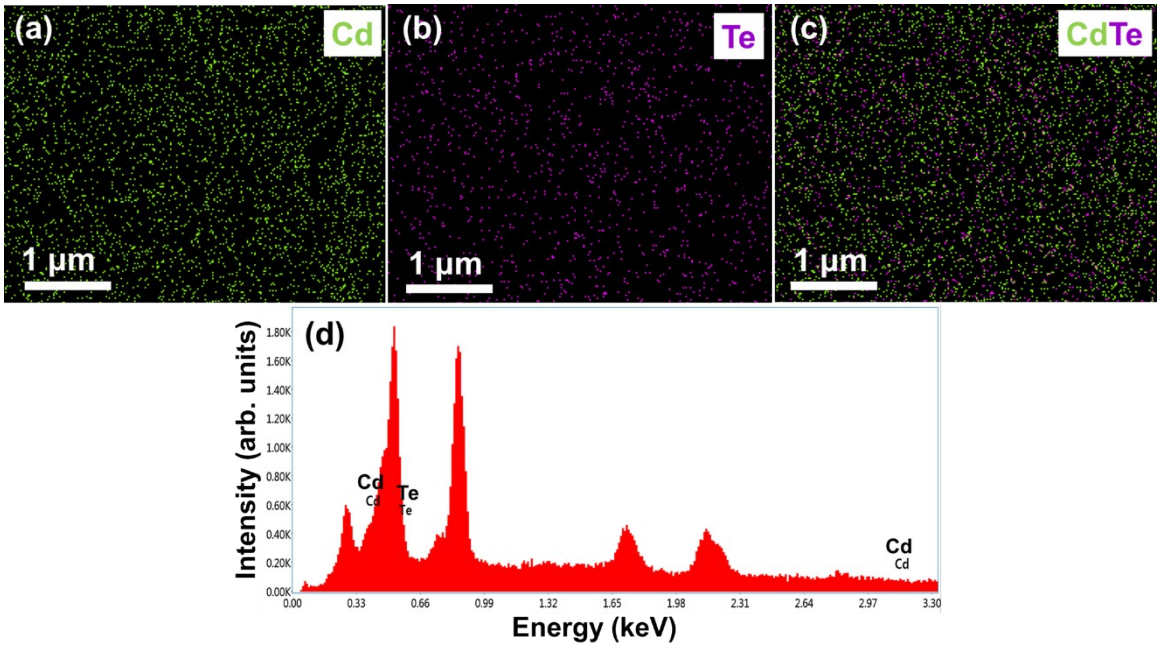

Fig. S1 Elemental mapping of (a) Cd, (b) Te, and (c) overall mapping, (d) EDX spectra of the sample LCT-0.

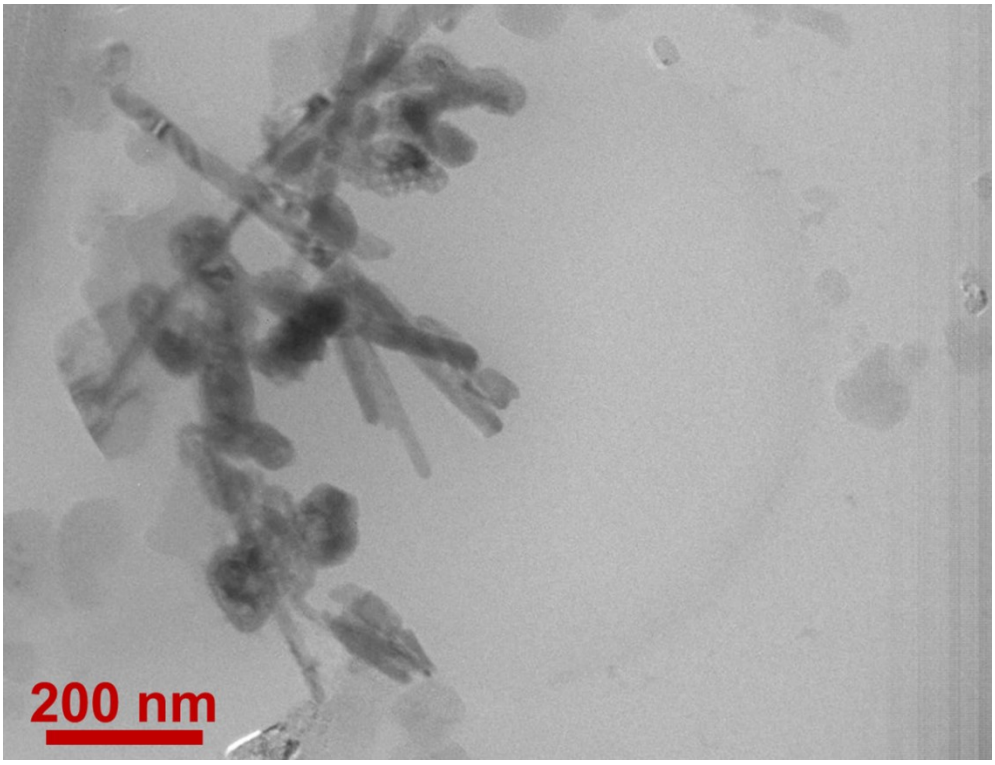

Fig. S2 TEM image of the sample LCT-3 at 200 nm.

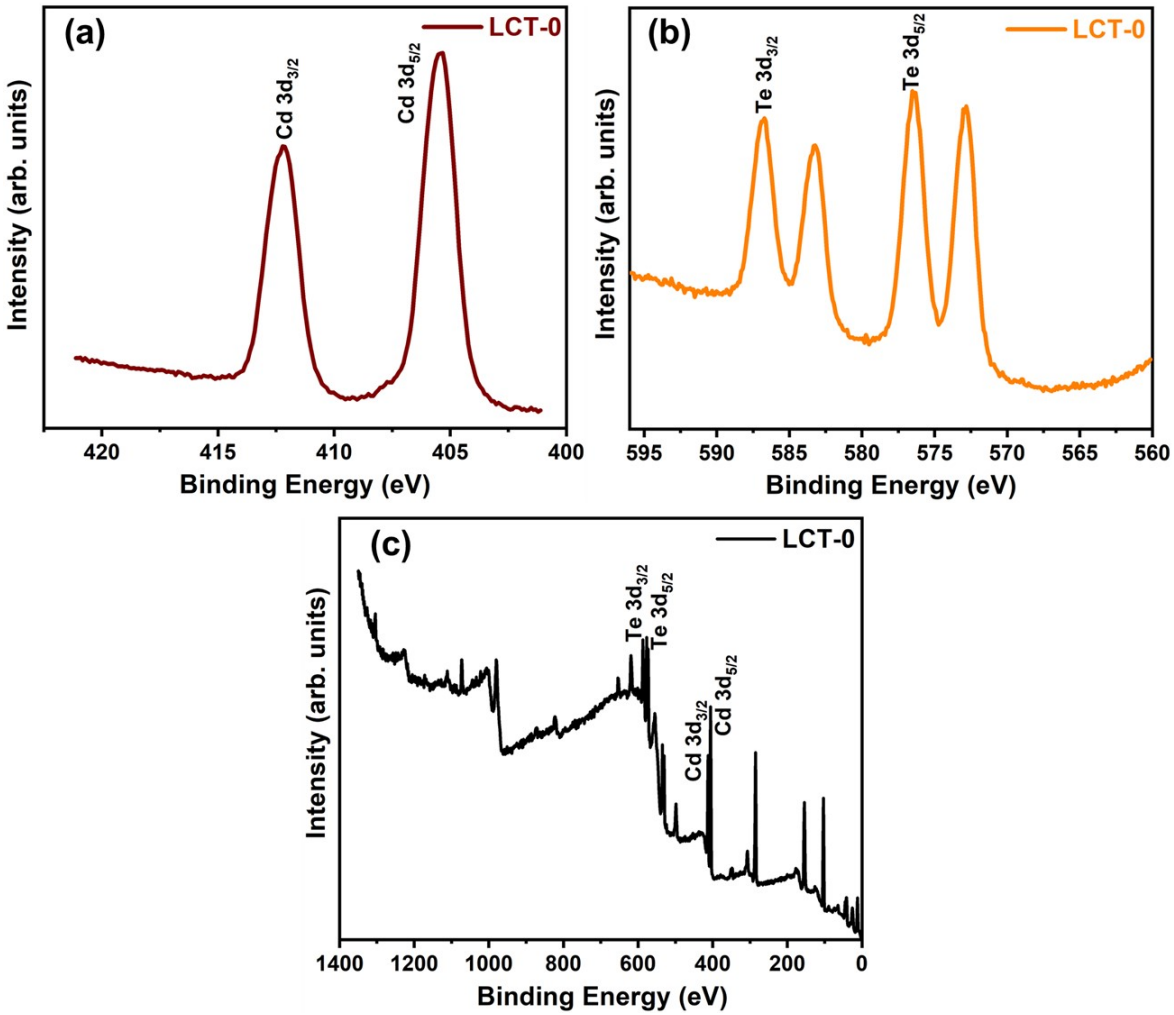

Fig. S3 XPS spectra of (a) Cd, (b) Te, and (c) survey spectra of the sample LCT-0.

Table S1 Elemental composition and quantification from EDX analysis.

Samples	**LCT-0 (undoped CdTe)**		**LCT-3**	
Elements	**Wt %**	**At %**	**Wt %**	**At %**
La	-	-	9.89	11.09
Cd	49.97	50.02	44.32	45.02
Te	50.03	49.98	45.79	43.89
Total	100	100	100	100

Table S2 Direct optical bandgap of all LCT samples.

Sl. No.	**Sample name**	**E_g (eV)**
1	LCT-0	2.17 ± 0.03
2	LCT-1	1.21 ± 0.03
3	LCT-2	2.02 ± 0.04
4	LCT-3	2.06 ± 0.03

Table S3 Formula of various models for refractive index calculation.

Model	Refractive index (n) formula
Dimitrov and Sakka	$\frac{n^2-1}{n^2+2} = 1 - \sqrt{\left(\frac{E_g}{20}\right)}$
Moss	$E_g n^4 = k$
Ravindra	$n_R = 4.084 - [0.62 \times E_g]$
Herve-Vandamme	$n^2 = 1 + \left(\frac{A}{E_g + B}\right)^2$
Tripathy	$n_T = 1.73 \times [1 + 1.9017 \times e^{-0.539 \times E_g}]$

Table S4 Refractive index of all LCT samples calculated from different models.

Samples	E_g (eV)	$n_{[DS]}$	n_T	n_M	n_R	$N_{[HV]}$
LCT-0	2.17	2.66	2.75	2.57	2.73	2.61
LCT-1	1.21	3.19	3.44	2.97	3.33	3.07
LCT-2	2.02	2.72	2.83	2.61	2.83	2.67
LCT-3	2.06	2.71	2.81	2.60	2.80	2.65