Supporting Information

Development of CeO_2 nanodot encrusted TiO_2 nanoparticles with reduced photocatalytic activity and increased biocompatibility towards a human keratinocyte cell line

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Mean crystallite size calculated using the Scherrer equation

The mean crystallite size for the samples prepared were calculated using the Scherrer equation and the x-ray diffraction data obtained:

$$\tau = \frac{\kappa\lambda}{\beta cos\theta} \quad \text{(S1)}$$

where τ is the mean crystallite size in the direction normal to the diffraction plane *hkl* (nm), κ a constant shape factor (0.9 used for unknown particle morphologies), λ the wavelength of incident x-ray radiation (nm), θ the angle of diffraction (radians) and β the full width half maximum or line broadening of the selected peak, taking into account the observed broadening of the sample and the broadening due to the instrumental arrangement (radians).

Figures and Tables

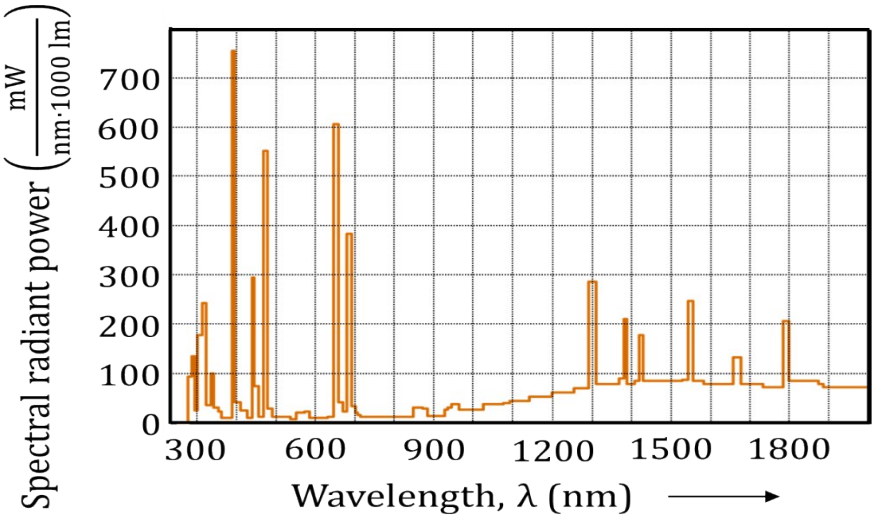

Figure S1: Light emission profile for the OSRAM Ultra-Vitalux 300 W sunlamp. Figure reproduced from Deka *et al*, 2008[1].

Table S1: Atomic and weight percentage loadings as determined from EDS analysis. The errors shown are the standard deviation between triplicate measurements.

Sample	Ce/Ti (at%)	Ce/Ti (wt%)
2.5% CeO_2/TiO_2	1.4±0.3	4±2
5% CeO_2/TiO_2	4±1	11±5
10% CeO_2/TiO_2	11±5	26±5

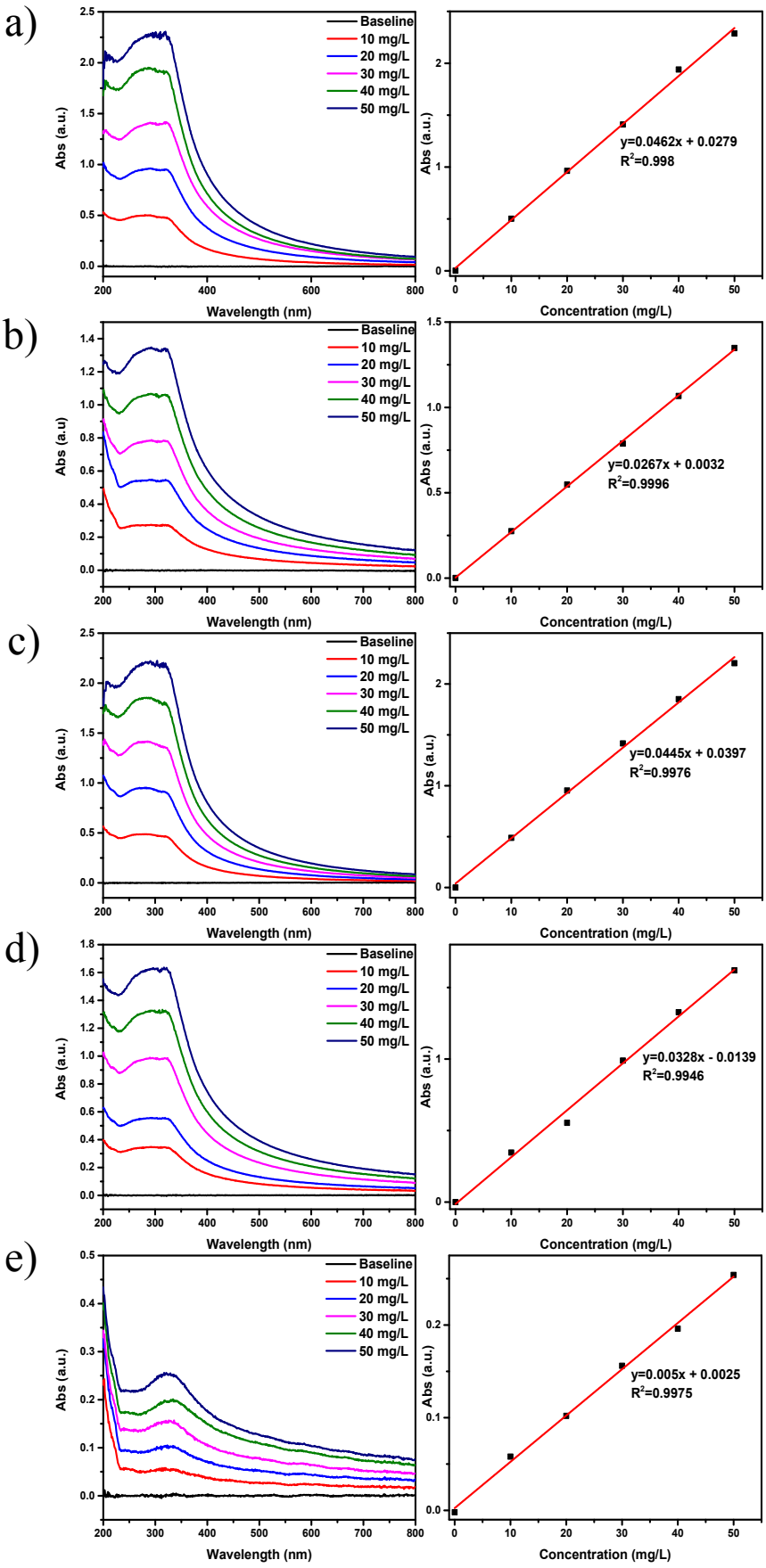

Figure S2: UV-Vis absorption plots and corresponding Beer-Lampert relationship plots for the a) TiO_2 (P25), b) 2.5at%, c) 5at%, d) 10at% and e) CeO_2 samples prepared.

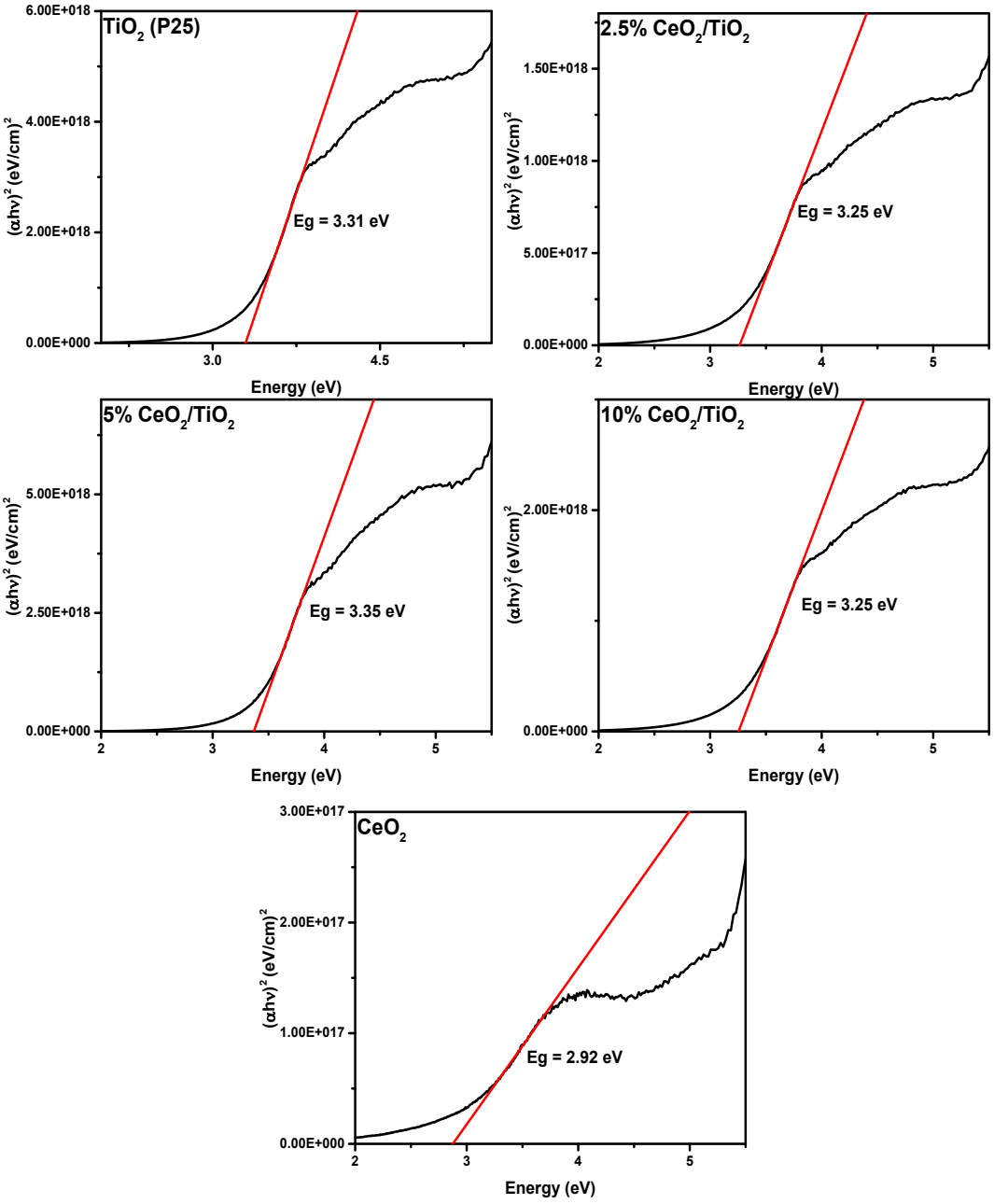

Figure S3: Tauc plots for the pristine and composite samples used to approximate the optical band gap for each sample.

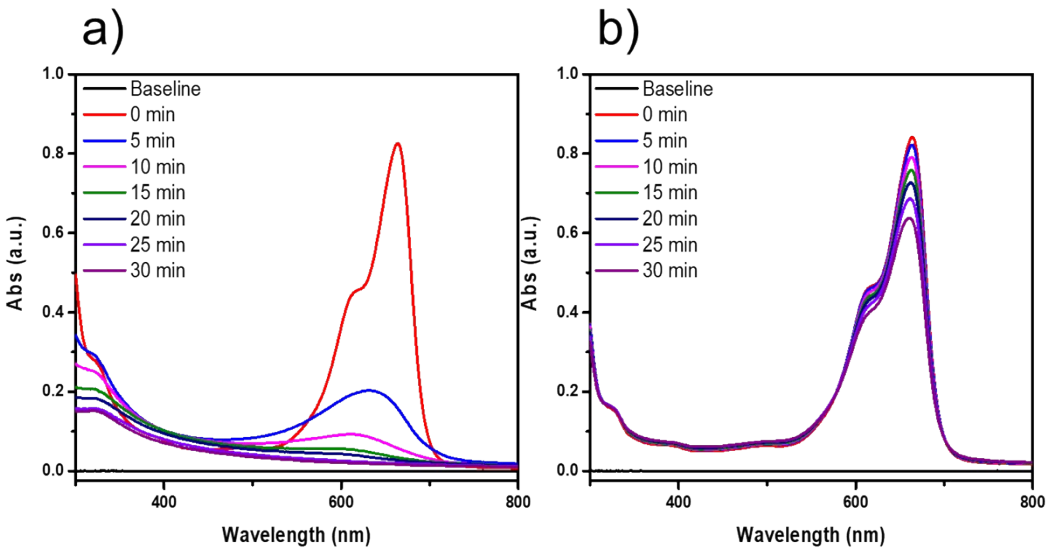

Figure S4: UV-Vis absorbance plots of methylene blue in the presence of a) TiO_2 (P25) and b) the 5% CeO_2/TiO_2 composite under UV irradiation.

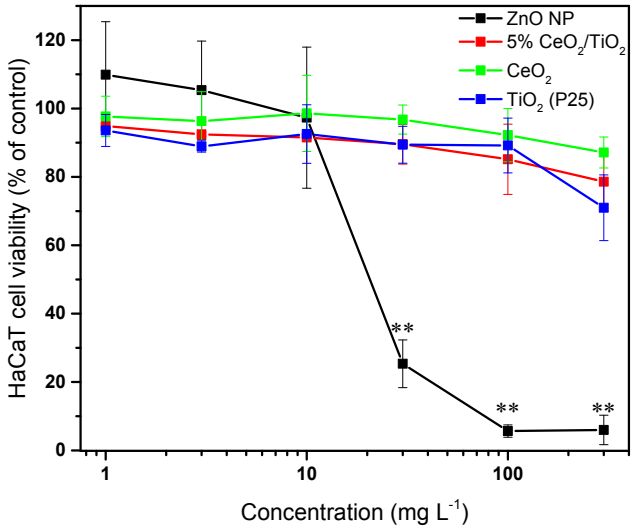

Figure S5: Impact of the pristine TiO_2 (P25), CeO_2 and nanocomposite CeO_2/TiO_2 samples on the mitochondrial function of HaCaT human keratinocytes over a 24 h incubation period. At the end of the incubation period, cell viability was assessed via the MTS assay. Data represents mean ± standard error of mean (n = 3 experiments). One-way ANOVA and Tukey post-hoc tests were performed to assess statistically different data sets. ** refers to $p < 0.01$ for the ZnO NP data set when compared to all other nanoparticle and nanocomposite sample data sets for the corresponding concentrations.

References

1. Deka M, Humar M, Rep G, Kričej B, Šentjurc M, Petrič M (2008) Effects of UV light irradiation on colour stability of thermally modified, copper ethanolamine treated and non-modified wood: EPR and DRIFT spectroscopic studies. Wood Science and Technology 42 (1):5-20