Highly stable spherical-shaped and blue photoluminescent cyclodextrin coated Tellurium nanocomposites prepared by in situ generated solvated electrons: a rapid green method, mechanistic and anticancer studies

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Supporting information

**NS1: Photoluminescence (PL) quantum efficiency (QE)**

The PL QE of the nanocomposites was evaluated by comparison method using equation (1). The standard reference employed was quinine sulfate ($\Phi = 0.55$) dissolved in 0.5 M sulfuric acid.

$$\Phi_S = \Phi_R \frac{A_S}{A_R} \frac{OD_R}{OD_S} \left(\frac{n_S}{n_R}\right)^2$$

(1)

Where ‘$\Phi$’ is the quantum yield, ‘$A$’ is the integrated PL intensity, ‘$OD$’ is the optical density, and ‘$n$’ is the refractive index. The subscript ‘$S$’ and subscript ‘$R$’ denotes the sample and reference, respectively.
Fig.S1. HRTEM images (a), (b), (c) of α-CD@Te NCs prepared with an absorbed dose of 25, 40 and 60 kGy, respectively.

Table S1. CHNS elemental analysis of α-CD@Te NCs

<table>
<thead>
<tr>
<th>Sample</th>
<th>Organic Carbon (%)</th>
<th>Hydrogen (%)</th>
<th>Nitrogen (%)</th>
<th>Sulphur (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>α-CD@Te NCs</td>
<td>35.671</td>
<td>5.88</td>
<td>0.12</td>
<td>0.119</td>
</tr>
</tbody>
</table>

Fig.S2. PL spectra of α-CD@Te NCs (prepared with an absorbed dose of 25 kGy) at various excitation wavelengths.
Fig. S3. Residuals of the best fits of PL lifetime decay curves corresponding to α-CD@Te NCs synthesized with various absorbed doses ($\lambda_{\text{ex}} = 339$ nm & $\lambda_{\text{em}} = 445$ nm).
**Fig. S4.** Residuals of the best fits of PL lifetime decay curves corresponding to α-CD@Te NCs synthesized with an absorbed dose of 25 kGy at different emission wavelengths (\( \lambda_{\text{ex}} = 339 \text{ nm} \)).
**Fig.S5.** The cytotoxic effect of α-CD@Te NCs in A549 and WI38 cells by MTT assay is presented. The cells were treated with increasing concentrations (0.01-100 µg/ml) of NCs for 48 h before the MTT assay. The results are presented as mean ± SD (n = 4).

**NS2:** It can be seen from Fig.S5 that the treatment of α-CD@Te NCs in the concentration range of 0.1 to 0.01 µg/mL did not cause any significant cytotoxicity in either the normal or cancerous cells. Further, an increase in the treatment concentration of α-CD@Te NCs in the concentration range of 1 to 100 µg/mL although showed significant cytotoxicity in normal cells, the effect appeared to be saturated. In order words, the cytotoxic effect of α-CD@Te NCs in normal cells did not show concentration dependency. On the other hand, treatment of α-CD@Te NCs in a similar concentration range exhibited a concentration-dependent cytotoxic effect.
in tumor cells. Similar observations have been reported by Medina Cruz et al. [1] in their recent study, wherein Te nanoparticles caused a decrease in the proliferation of cells for both healthy and cancer cell lines. However, the decay was found to be more pronounced for cancer cells, showing higher cytotoxicity.

Reference: