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Raman spectroscopy-based detection of as-grown suspended carbon nanotubes for integration into sensors

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Calculation of the uncertainty of the experimentally determined detection yields of suspended carbon nanotubes (CNT) with Raman spectroscopy:

In total we studied 1676 CNTs stemming from seven different growth substrates. By considering the fluctuations in the Raman spectroscopy detection yields between chips we can estimate an uncertainty about the total yield (Y_{total}). The sample standard deviation is calculated as follows:

$$\sigma_{yield} = \sqrt{\frac{(Y_1 - Y_{total})^2 + (Y_2 - Y_{total})^2 + \cdots + (Y_i - Y_{total})^2}{N - 1}}$$

where Y_i is the Raman spectroscopy detection yield of chip i, Y_{tot} the average detection yield of all chips, and N is seven here (seven chips). This uncertainty based on fluctuations between chips is calculated for the detection yields considering the CNT-specific Raman G band, or the D* band, or both the G and the D* bands. It is calculated considering the 488 nm laser only, the 514 nm laser only, or both lasers.

The detection yield is reported as $Y_{total} \pm 1.3\sigma_{yield}$ in Table 1 of the main text. This corresponds to approximately 80% of the data falling within this range, assuming a normal distribution.

Next, are histograms of the detection yield fluctuations across different chips, showing the frequency of chips having Raman spectroscopy detection yields in a certain range.

- Using both 488 nm and 514 nm wavelength lasers:

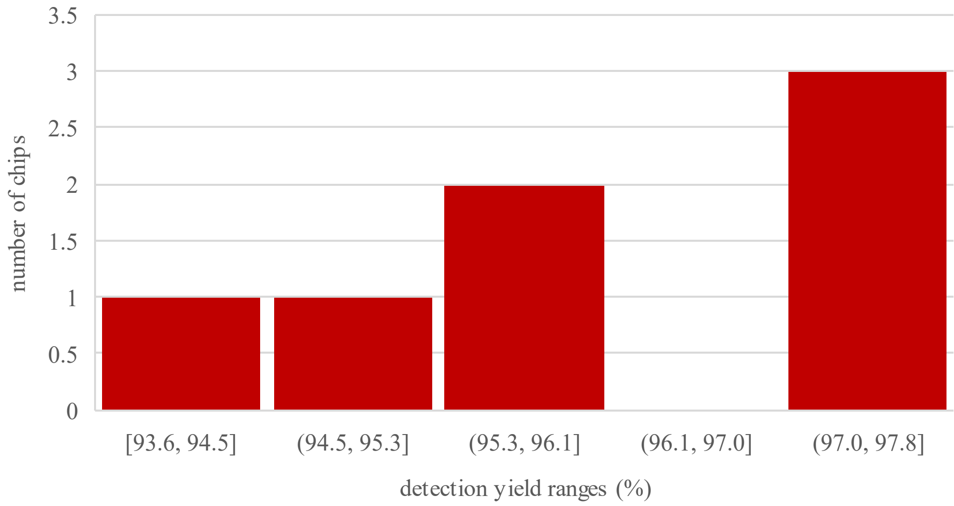

Fig. S1: Raman detection yield using both 488 nm and 514 nm wavelengths lasers and considering both G and D* bands across chips.

- Using 488 nm wavelength laser only:
    - Considering both G and D*:

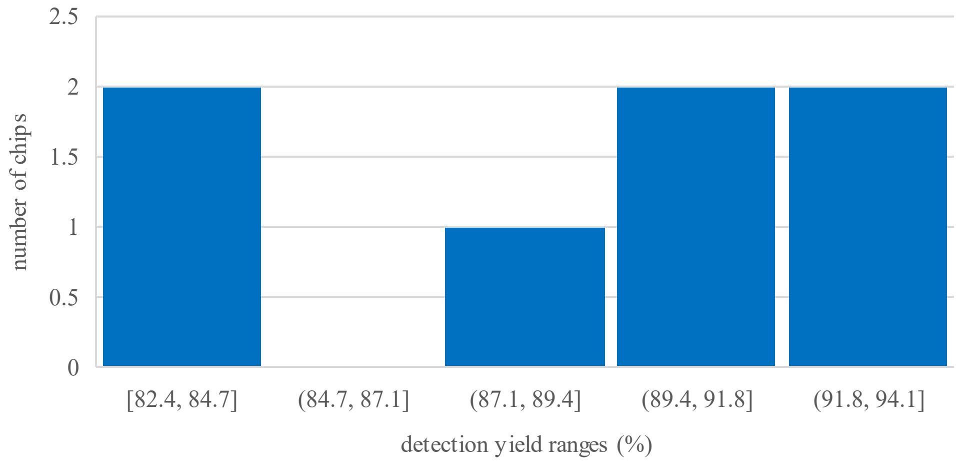

Fig. S2: Raman detection yield using the 488 nm wavelength laser and considering both G and D* bands across chips.

- Considering G:

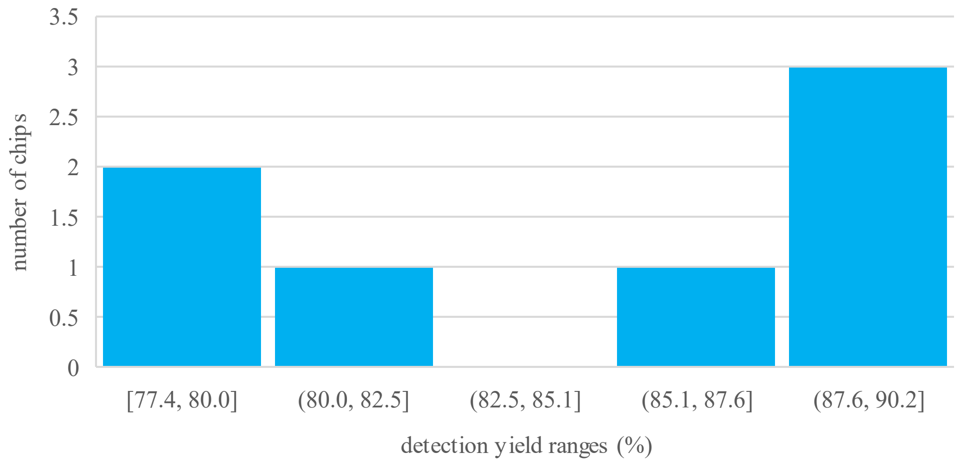

Fig. S3: Raman detection yield using the 488 nm wavelength laser and considering G band across chips.

- Considering D*:

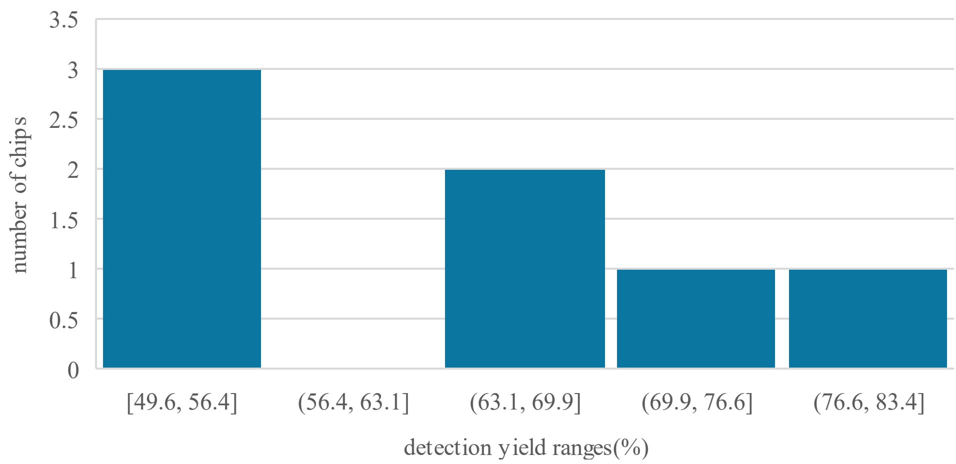

Fig. S4: Raman detection yield using the 488 nm wavelength laser and considering D* band across chips.

- Using 514 nm wavelength laser only:
  - Considering both G and D*:

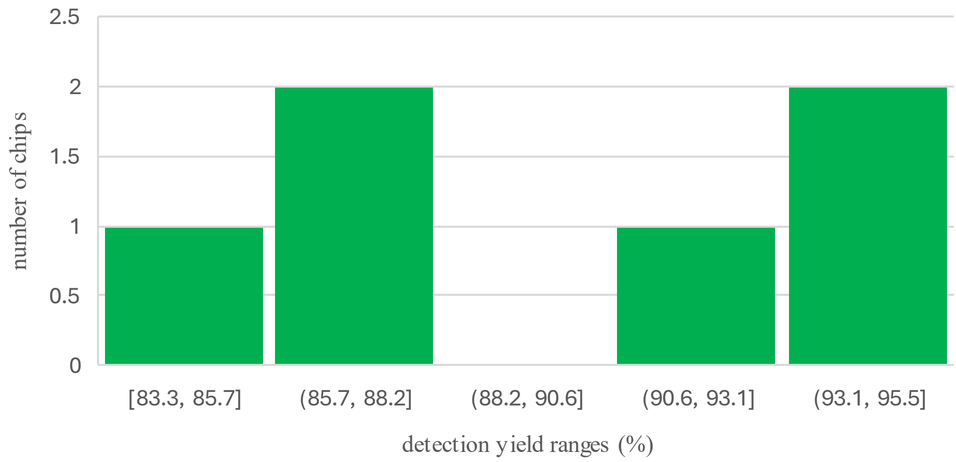

Fig. S5: Raman detection yield using the 514 nm wavelength laser and considering both G and D* bands across chips.

- Considering G:

Fig. S6: Raman detection yield using the 514 nm wavelength laser and considering G band across chips.

- Considering D*:

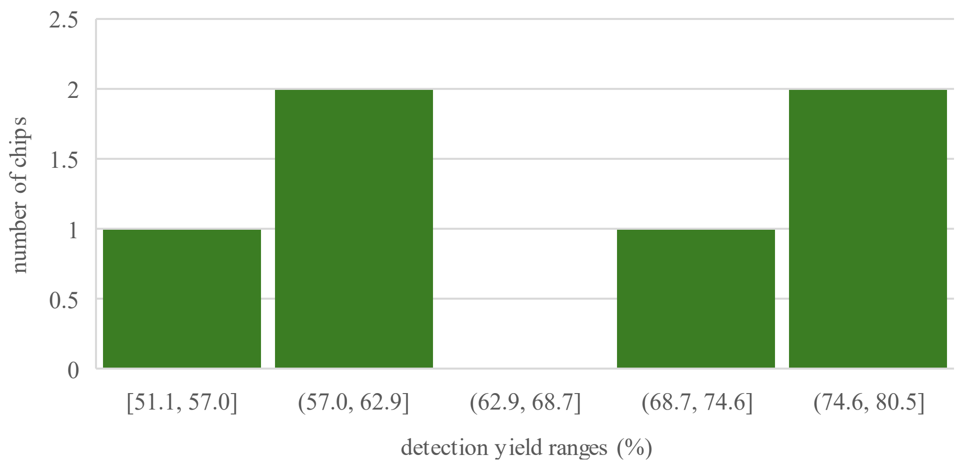

Fig. S7: Raman detection yield using the 514 nm wavelength laser and considering D* band across chips.