Supplementary Materials

Article

A Diamond Temperature Sensor Based on the Energy Level Shift of Nitrogen-Vacancy Color Centers

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The concentration of nitrogen impurities in diamond can be estimated based on the absorption at 270 nm on the UV-Visible spectra [1], as shown in Figure S1. And the nitrogen concentration (N_S) (ppm) is proportional to the absorption coefficient at 270 nm (α_S) (cm^{-1}) [2]:

$$N_S = 0.56\alpha_S$$

According to the UV-Visible spectra, the calculated absorption coefficient and the nitrogen concentrations of three diamond samples is shown in Table S1. The diamond samples have been labeled using the concentration of nitrogen atoms in Figure 1. And a brief introduction of the calculation of nitrogen concentration in diamond has been also added as a supporting information.

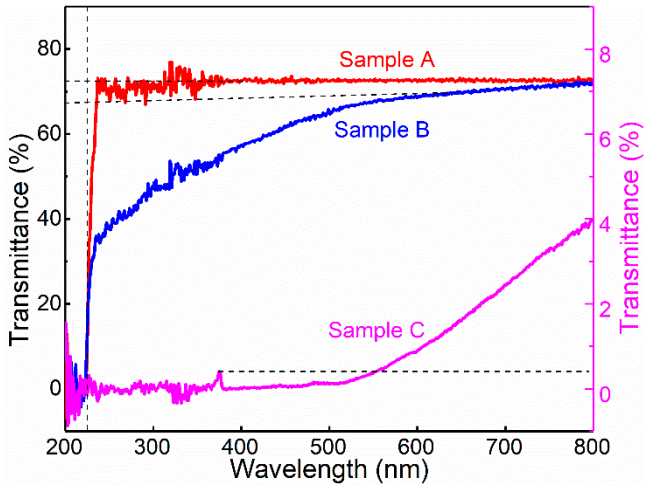

Figure S1: UV-Visible spectra of three diamond samples (A, B, C)

Table S1: The calculated absorption coefficient and the nitrogen concentrations of three diamond samples

Samples	A	B	C
Transmittance at 270 nm	0.711	0.404	0.001
Diamond thickness (mm)	0.552	0.191	0.286
Absorption coefficient: α_S (cm^{-1})	6.2	47.7	241.5
Nitrogen concentration: N_S (ppm)	3.5	26.7	127.7

Reference

1. Chrenko, R.M.; Strong, H.M.; Tuft, R.E. Dispersed paramagnetic nitrogen content of large laboratory diamonds. *Philosophical Magazine* **1971**, *23*, 313–318.
2. Sumiya, H.; Satoh, S. High-pressure synthesis of high-purity diamond crystal. *Diamond and Related Materials* **1996**, *5*, 1359–1365.