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Room temperature optical thermometry based on the luminescence of the SiV defects in diamond*

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Diamond microcrystals containing silicon-vacancy (SiV) defects were synthesized by using a high-pressure high-temperature treatment of a mixture of pertinent organic-inorganic precursors. Photoluminescence of the SiV defects and its temperature dependence (80–400 K) were studied. A strong sharp zero-phonon line (ZPL) at 738 nm was recorded at all temperatures under 488 nm laser excitation. In particular, the thermally induced shift of the ZPL was found promising for optical temperature sensing in the near infrared spectral range at biomedically relevant temperatures.

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