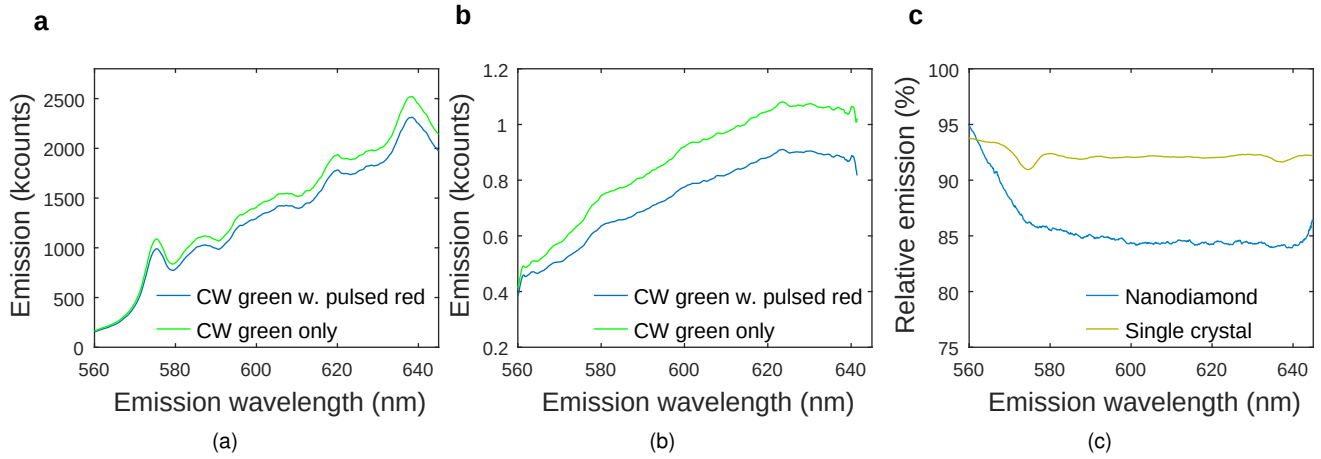
SUPPLEMENTARY NOTE 1

All measurements in the main text were taken with single crystal diamond. To test the generality of the results we compared a single crystal sample to nanodiamonds on a silicon substrate under the same conditions. The effect of emission reduction in the single crystal [Suppl. Fig. 1(a)] could be reproduced with the nanodiamonds [Suppl. Fig. 1(b)]. The ZPLs are washed out in the nanodiamond spectra which is not uncommon due to a larger variation of strain and other factors in the different nanodiamonds compared to the single crystal. The signal is also noisier in the nanodiamonds, which we counteracted with a larger smoothing-window of 13 nm compared to the 4-nm-window for the single crystal. The average reduction however is stronger in the nanodiamonds (to ∼85%) than in the single crystal (to ∼92%), see Suppl. Fig. 1(c). This was expected because the single crystal has a thickness of approximately 500 μm and therefore a relatively large volume, some of which is out of focus. In this volume we expect the red laser to be too weak to create significant stimulated emission, but the green laser still strong enough to create background fluorescence. A high percentage reduction in the focussed volume is therefore likely combined with NV background fluorescence and low reduction from the defocussed volume. The nanodiamonds on the other hand had a size of approximately 120 nm and the majority of the illuminated volume was highly focussed. Uniform illumination over the sample is therefore much more likely for the nanodiamonds. Nanodiamonds are however less suitable to be used as a laser medium in an optical cavity because the large number of surfaces typically results in strong scattering and loss.



Supplementary Figure 1: Comparison between single crystal and nanodiamonds under the same conditions. **(a)**: Single crystal (SC) diamond **(b)**: Nanodiamonds (ND). The emission reduction by the pulsed supercontinuum source at 700 nm is seen for both samples. **(c)**: Dividing the lower curve by the upper curve in (a) and (b) respectively we get the relative emission. The percentage reduction is stronger (although noisier) in the nanodiamond. The SC spectra were smoothed with a 4-nm-window, the noisier ND spectra were smoothed with a 13-nm-window.