

Figure S1. XRD patterns of the SrF_2 : Yb^{3+} , Er^{3+} NPs, pure and modified fiber.

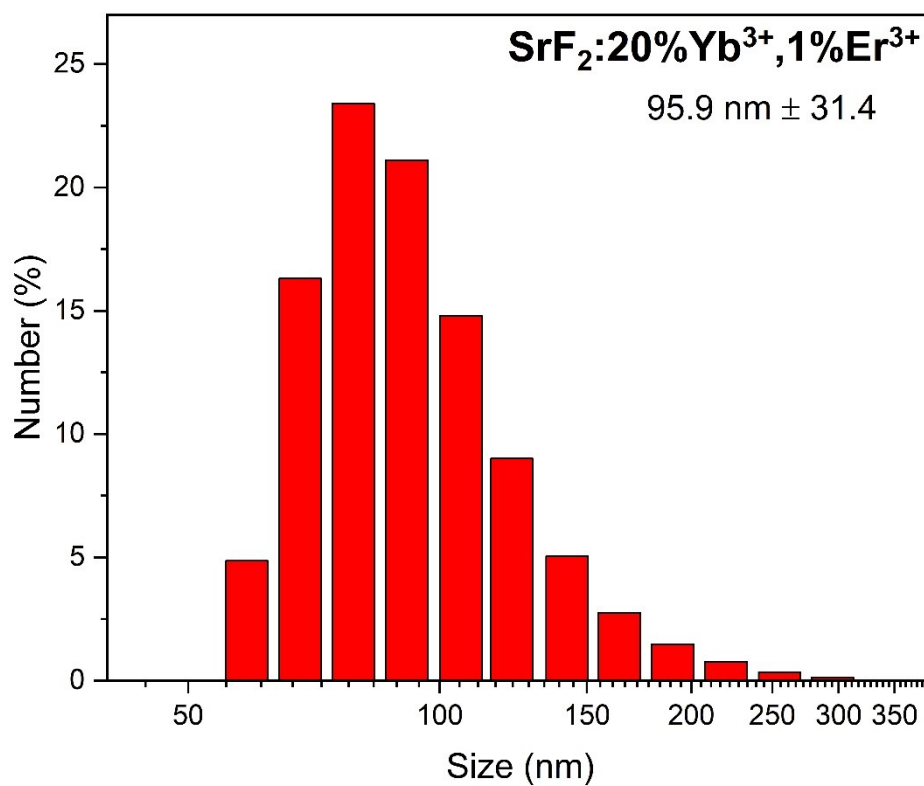


Fig. S2 DLS analysis of the nanoparticles SrF_2 doped with 20% of Yb^{3+} and 1% Er^{3+} ions.

Table S1 Metal ions composition of synthesised NPs analysed by ICP-OES.

Sample	Sr ²⁺	Yb ³⁺	Er ³⁺
SrF ₂ :20%Yb ³⁺ , 1 %Er ³⁺	75.22	23.63	1.15

Table S2 Zeta potential of fluoride modifier SrF₂ in physiological pH

Sample	pH	Zeta potential [mV]
SrF ₂ :20%Yb ³⁺ , 1 %Er ³⁺	7.46	-19.5 ± 8.1

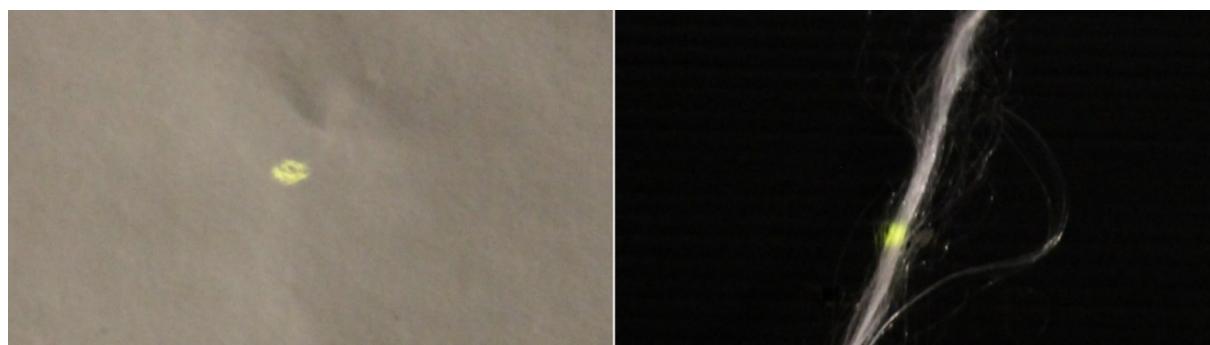


Fig. S3 Photo of the paper (left) and fiber (right) modified with FM under CW laser excitation, $\lambda_{\text{exc}} - 980 \text{ nm}$.

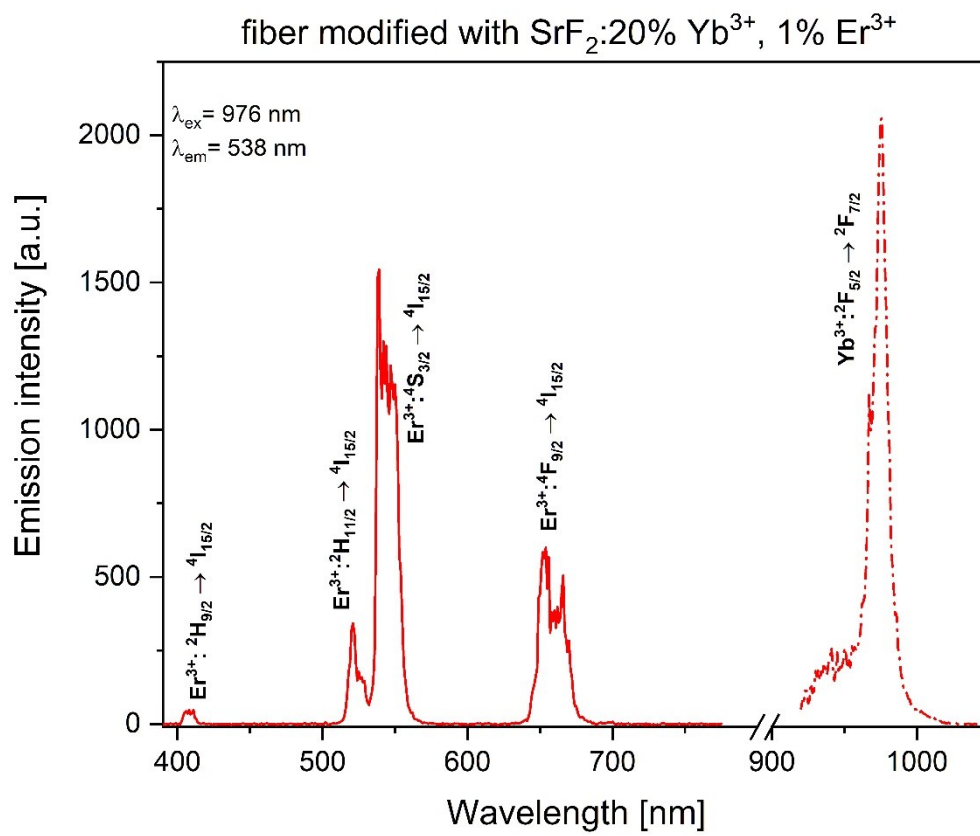


Fig. S4 Emission and excitation spectra of modified fibres excited with impulse laser.

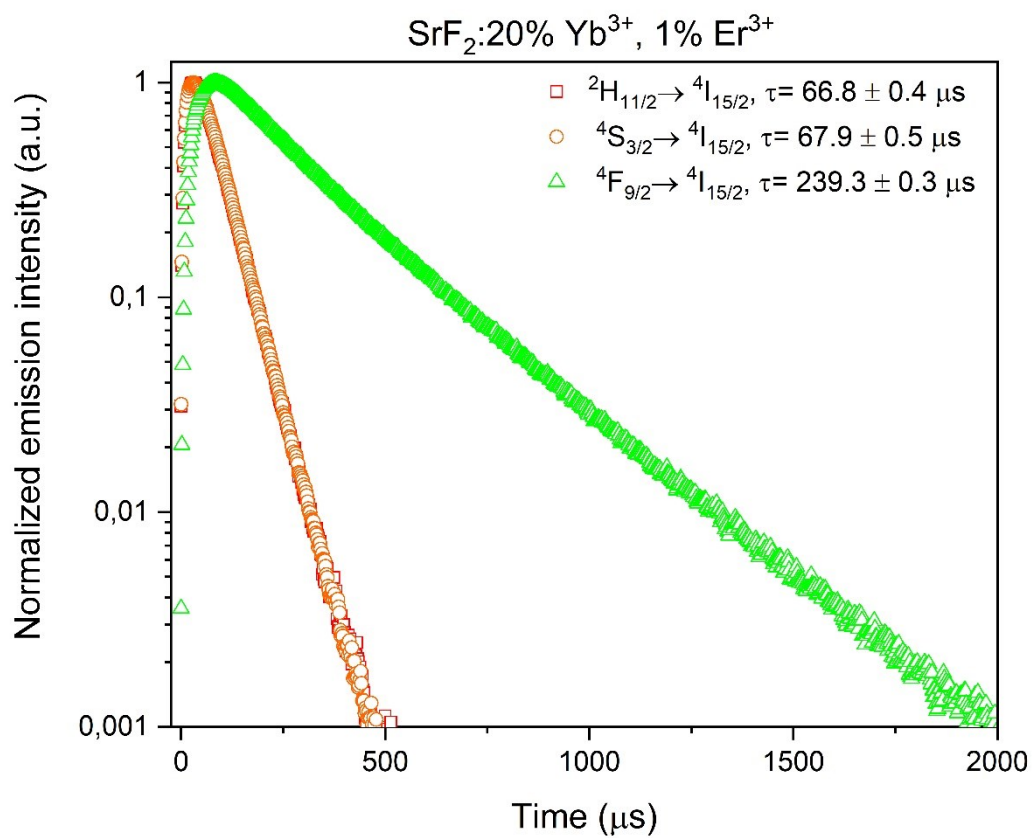


Fig. S5 Upconversion luminescence decay curves and determined lifetimes of SrF₂:Yb³⁺, Er³⁺ NPs (FM).

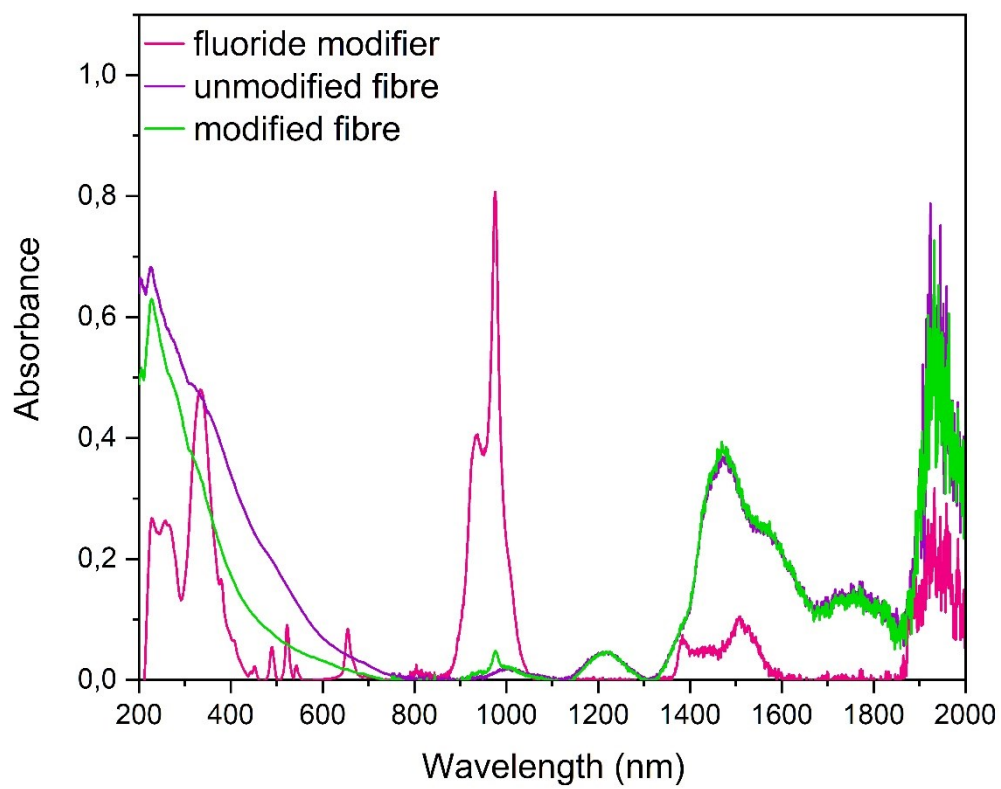


Fig. S6 Absorbance of fluoride modifier, unmodified fibre and modified spectra

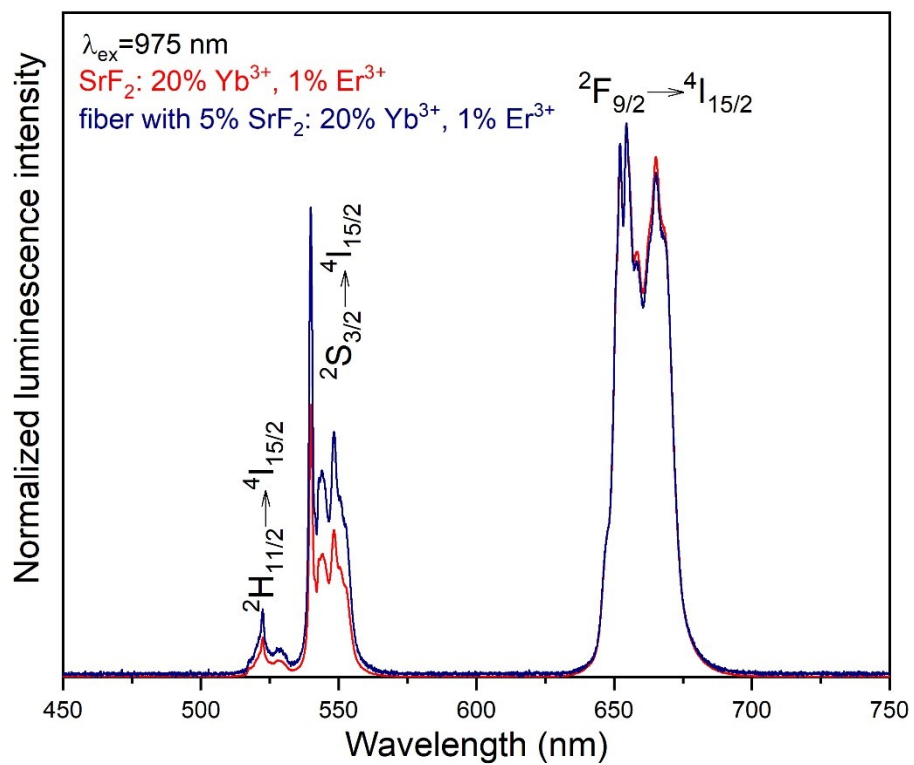


Fig. S7 Emission spectra of FM NPs and fibers modified with FM.

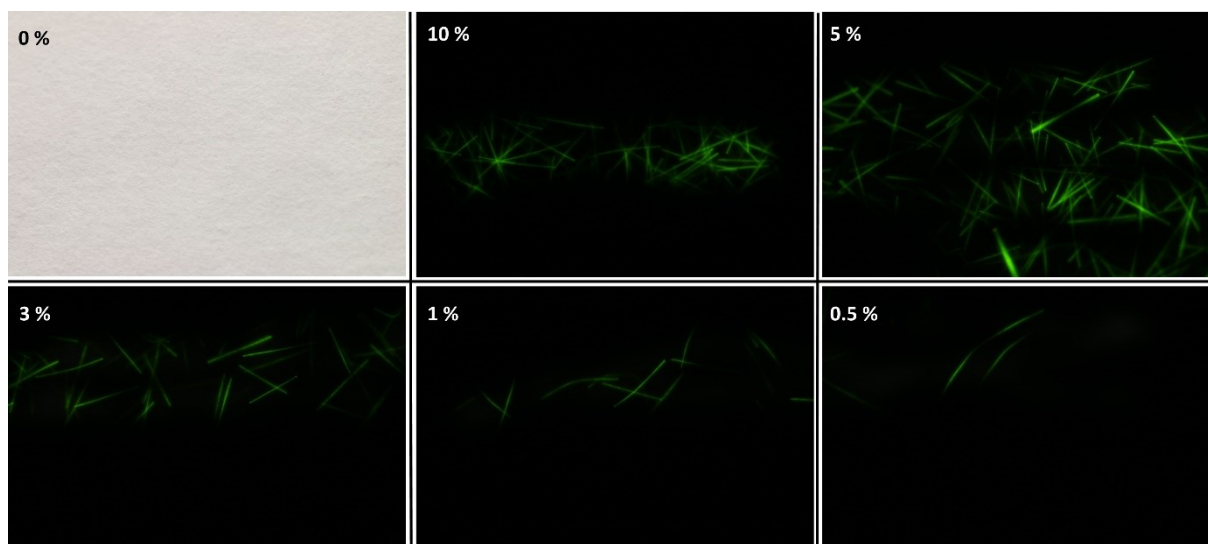


Fig. S8 Photographs of modified paper sheets taken with a Canon EOS 70D camera.