Design, Luminescent properties and Application of Cr^{3+} doped $ScTaO_4$: a broadband near-infrared phosphor

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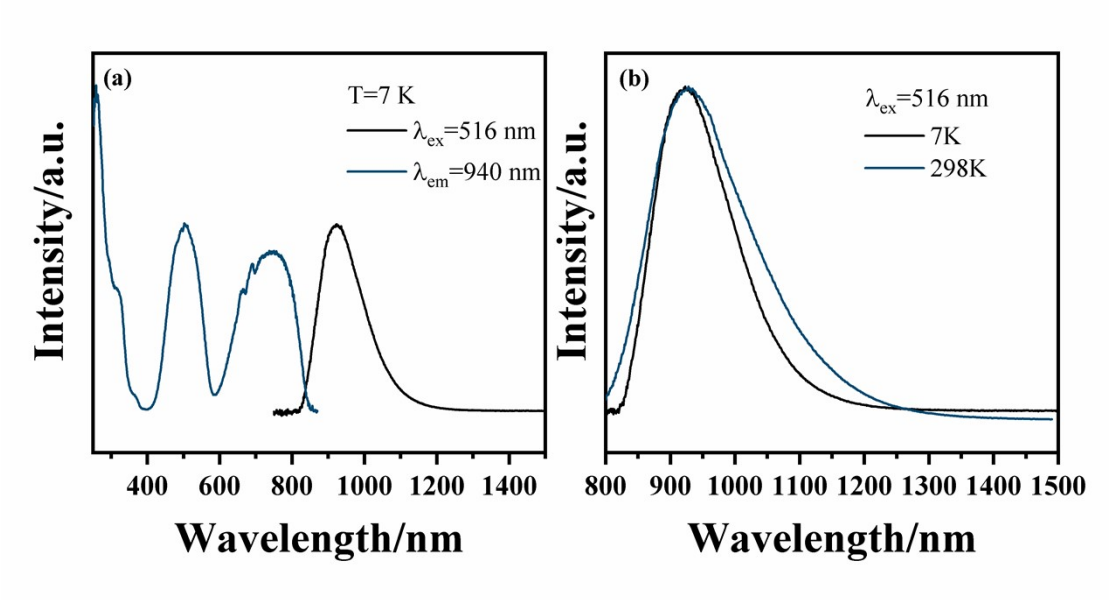

Fig. S1. (a) The excitation and emission spectrum of $ScTaO_4$:0.02Cr^{3+} at 7 K (b) Normalized emission spectrum at 298 K and at 7 K

We measured the lifetime at 7 K. The decay curve can be well fitted with the single-order exponential decay model, expressed by the following equation:

$$I = I_0 + A\exp(-t/\tau)$$

here I_0 represents the initial emission intensity, A is a constant, and τ is the lifetime. The single-exponential decay model indicates that the Cr^{3+} ions only occupy one type of lattice site in $ScTaO_4$:0.02Cr^{3+}.

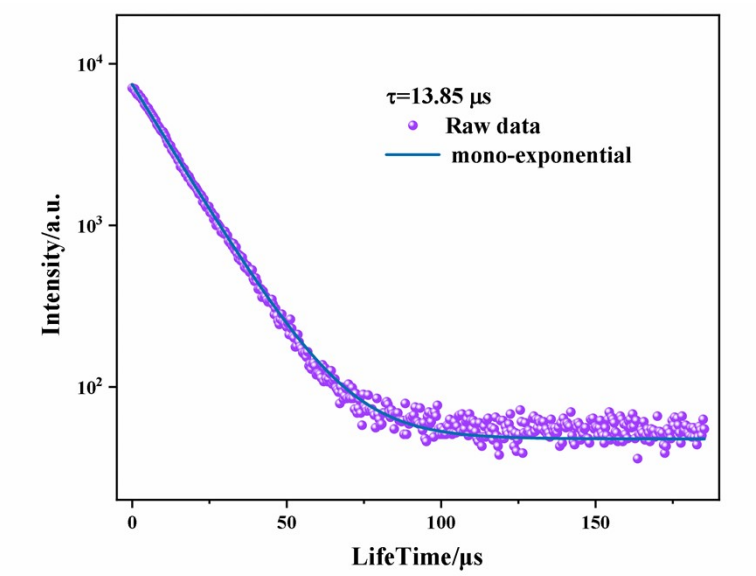

Fig. S2. The PL decay curves of the $ScTaO_4$:0.02Cr^{3+} at 7 K (λ_{ex}=516 nm)

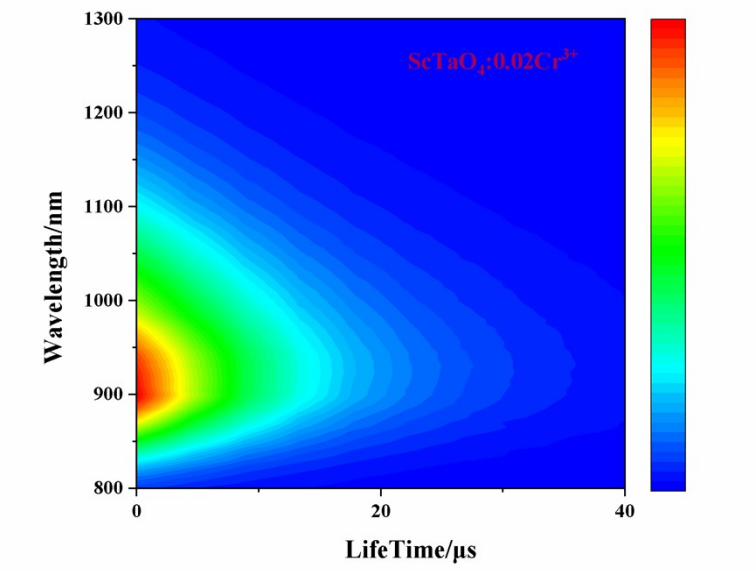

Fig. S3. Time resolved spectroscopy of the $ScTaO_4$:0.02Cr^{3+} sample excited at 516 nm