Review of: "Excitation-power-dependent upconversion luminescence competition in single β-NaYbF4:Er microcrystal pumped at 808 nm"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

Yuan et al. have successfully synthesized a series of β-$NaYbF_4$:Er microrods with intense green and red UCL by a simple hydrothermal method and investigated their spectra features based on single particle level. Particularly, the competition between the green and red UCL can be observed in highly Yb^{3+}-doped microcrystals as the excitation intensity gradually increases, which leads to the UCL color changes from green to orange. A detailed description of the mechanism leading to color changes is provided based on the cross-relaxation (CR) processes between Yb^{3+} and Er^{3+} ions. The manuscript is also thorough and well written. It is worthy of publication though below question should be considered.

1. In **Results and discussion part**, line 1 " Fig. 1a-c shows the SEM images of the as-prepared β-NaYbF4: Er microcrystals doped with different Yb3+ concentrations. " should be " Fig. 1a-c shows the SEM images of the as-prepared β-NaYF4:Er,x%Yb (x=98, 60 and 20) microcrystals doped with different Yb3+ concentrations ".

There are similar expressions in many places in the text, such as, abstract part: “a series of β-$NaYbF_4$:Er microrods were synthesized by a simple one-pot hydrothermal method and their intense green”

1. In Fig. 2, excitation power density should be added.
2. It is recommended that $NaYF_4$: 98Yb%, 2%Er should be replaced with NaYbF4: 2%Er in Fig. 2 and Fig. 3.
3. “Notably, for doping with 98% and 60% Yb3+ concentrations of microcrystals, the red and green UCL appear saturation effects”, Appropriate references should be cited here to facilitate readers to understand the saturation effect (such as Physical Chemistry Chemical Physics, 2017, 19, 4288-4296).

Luminescence patterns of a single particles should be explained, please see references (such as Scientific Reports, 2016, 6, 22433)