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Spectroscopic Properties of Nd^{3+} doped Sr_2LaF_7 Nanoparticles

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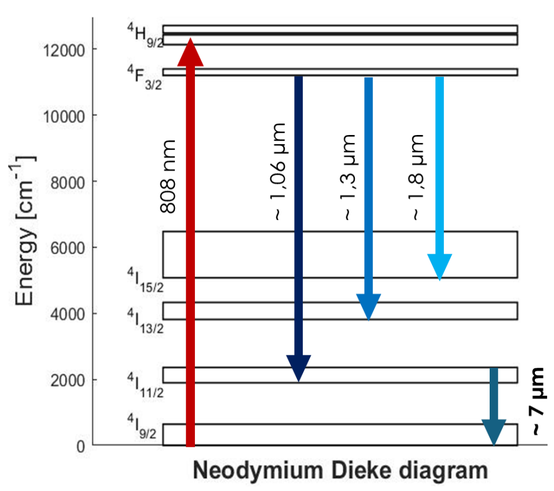
INTRODUCTION

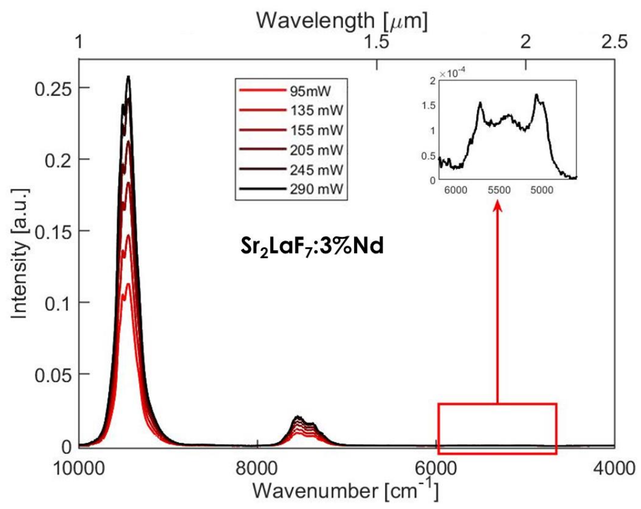
SLF:
- Upconversion material
- Used for bioimaging[1]
- Low phonon energy, good for infrared emission

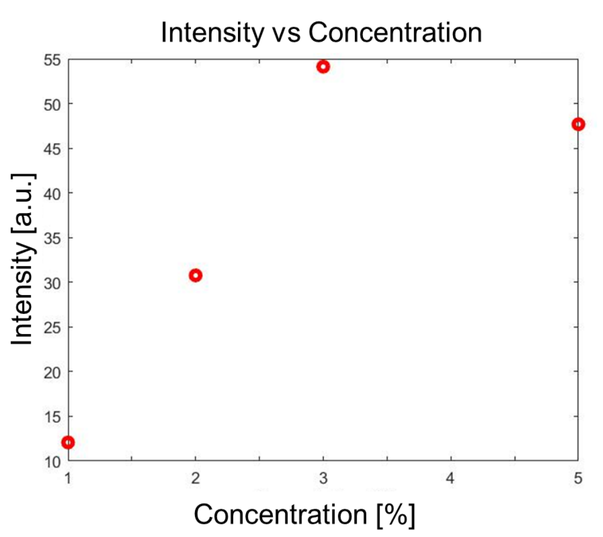
Nd:
- Laser emission
- Good infrared emitter

SLF:Nd:
- In band thermometry
- Infrared Light sources



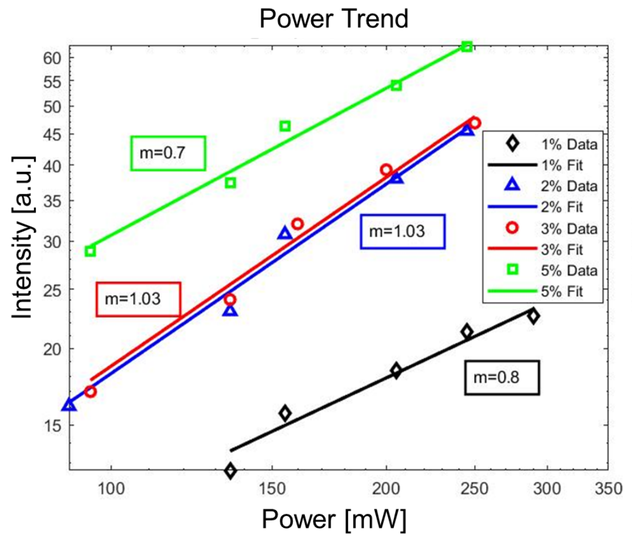
NEARINFRARED CHARACTERIZATION

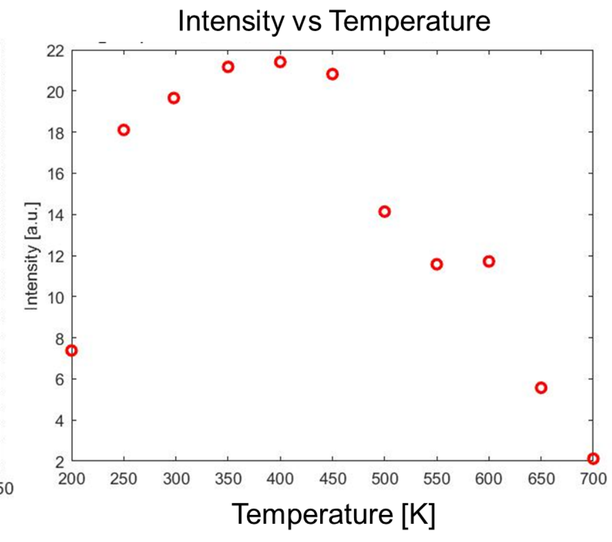




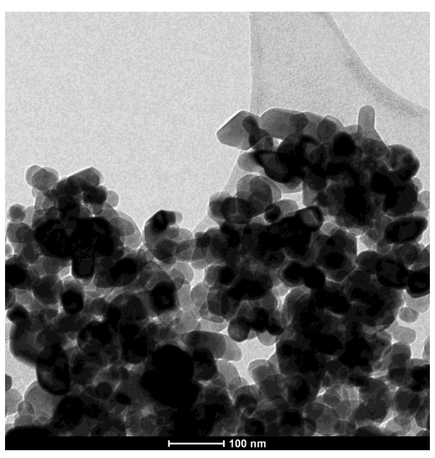
NANOPARTICLES GROWTH & CHARACTERIZATION

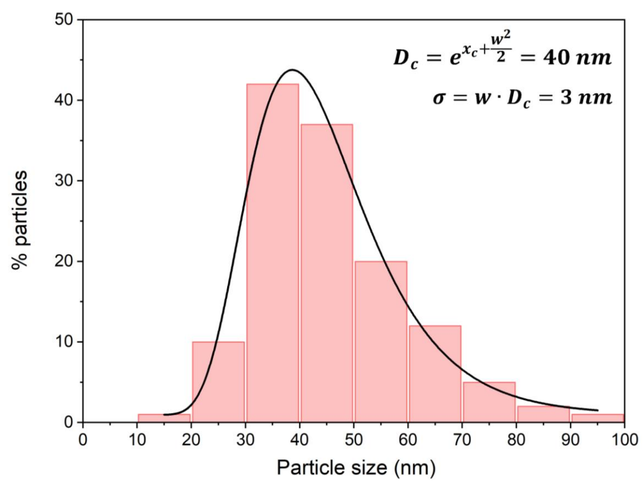
- Hydrothermal Synthesis
- Annealing at 400°C for 5 h.
- $Sr_2La_{1-x}F_7$:xNd (x = 1, 2, 3, and 5 mol%)





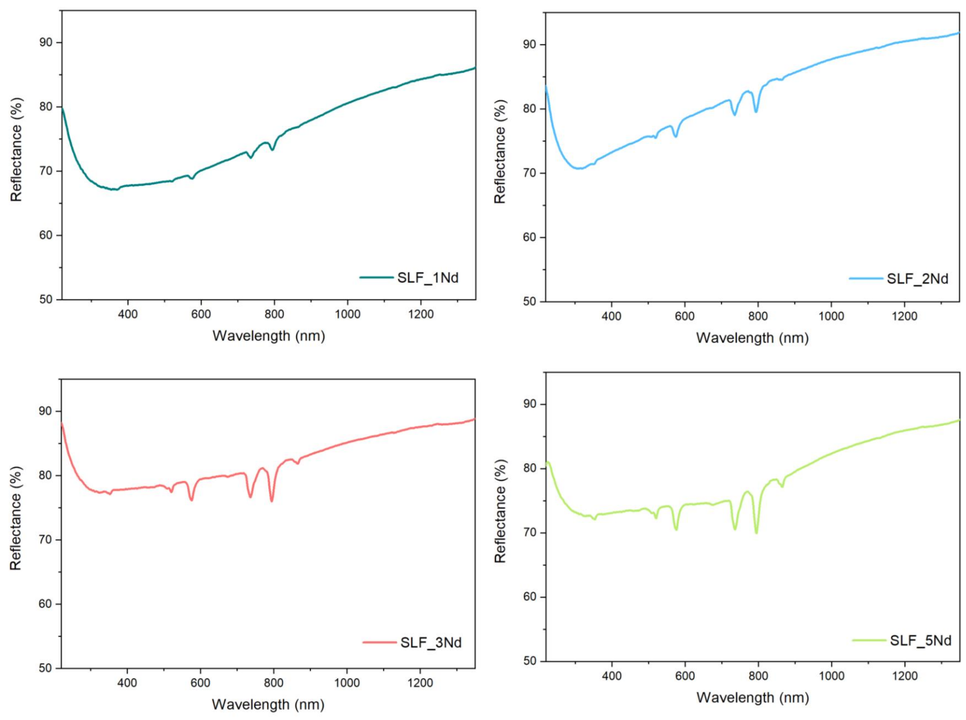
Good crystalline structure & Nanoparticle dimension around 30 nm





Nanoparticle dimension in agreement with XRD results

- 3%Nd:SLF has the strongest emission
- The emission trend with power is linear or slightly sublinear for every Nd concentration
- Unexpected Intensity vs Temperature trend, with a maximum around 400 K. Measurement were taken at fixed pump power



Absorption peak wavelengths:

351 nm
520 nm
576 nm
736 nm
795 nm
865 nm

CONCLUSION

We successfully prepared SLF:Nd nanoparticles
Morphologic and spectroscopic characterization
Infrared emission characterized

FUTURE WORK / REFERENCES

Emission lifetime measurements as a function of temperature
LIR at 1.06 µm for in-band thermometry.

[1] B. Milićević *et al, Nanomaterials* **2023**, *13*, 30. https://doi.org/10.3390/nano13010030