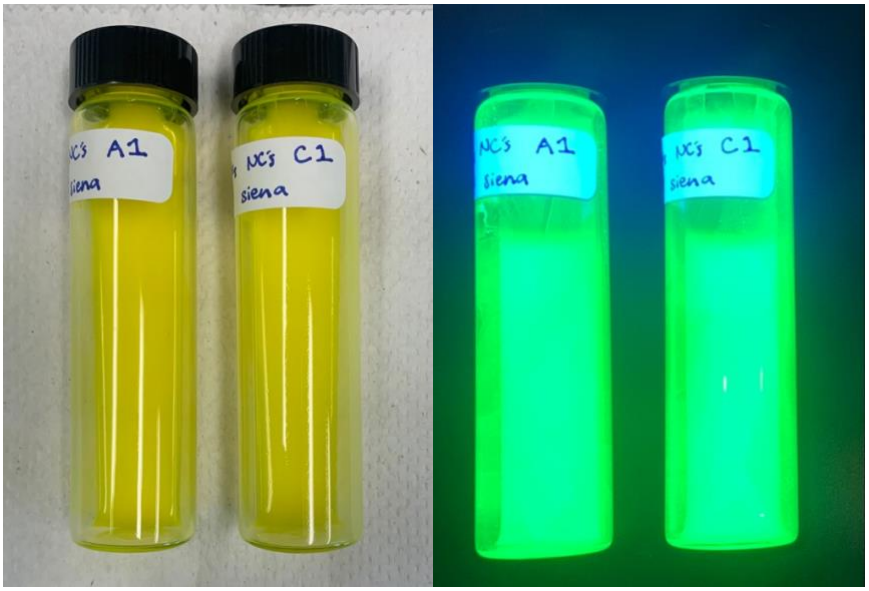
Lithium Dubbed $CsPbBr_3$ Perovskite Nanocrystals

A is made using 0.5mL Cs_2CO_3 solution
C is made using 0.425mL Cs_2CO_3 solution and 0.075mL Li_2CO_3 solution
1: solutions as prepared by procedure
2: 60µL of solution 1 in 5mL hexane directly after synthesis
3: 60µL of top layer from solution 1 in 5mL hexane 1 day after synthesis
4: 50µL of solution 1 mixed/ including precipitate at bottom
5: 50µL of top layer from solution 1 after 1 day
    A5y/C5y → yellow portion of sample on slide A5/C5
    A5c/C5c → clear portion of sample on slide A5/C5
6: 60µL of top layer from solution 1 in 5mL hexane 1 week after synthesis



Regular light UV-light (365 nm)

The data bellow illustrates the light emission of the $CsPbBr_3$ (A) and Li:$CsPbBr_3$ (C) nanocrystals (NC's)while under 365 nm ultra-violet light. Both NC's emit green light as can be seen in the images of the samples under UV-light. Initially the Li:$CsPbBr_3$ samples have a slight red shift compared to the $CsPbBr_3$ sample, meaning the wavelength that is emitted is slightly larger. This can be seen in sample set 2. Red shifts are often due to larger particle size. However, after sitting the lithium dubbed NC's have a blue shift compared to the standard NC's. This would suggest that reactions are happening with the ligands encapsulating the NC's allowing for the particles to change size and become smaller. Since the emissions don't change in intensity aver time this is more likely than just degradation of the NC's. In sample sets 3 for both A and C there is a blue shift meaning these particles (which came from the top layer for sample set 1) are smaller than set 2 which came from sample set 1 while the solution was mixed. Despite this being the portion of set 1 which is most luminescent. Set 3 does not seem to be as stable as when the NC's are mixed. When this top layer of set 1 is diluted a week later to make sample set 6 the emissions are the same as what set 3 had initially been. The samples made 08/10/21 would suggest that the lithium added helped to stabilize the NC emission however the sample set from 08/20/21 would suggest the opposite. Samples 4 and 5 show the opposite for the stability of the particle based off if lithium is included and which layer was used for the sample.

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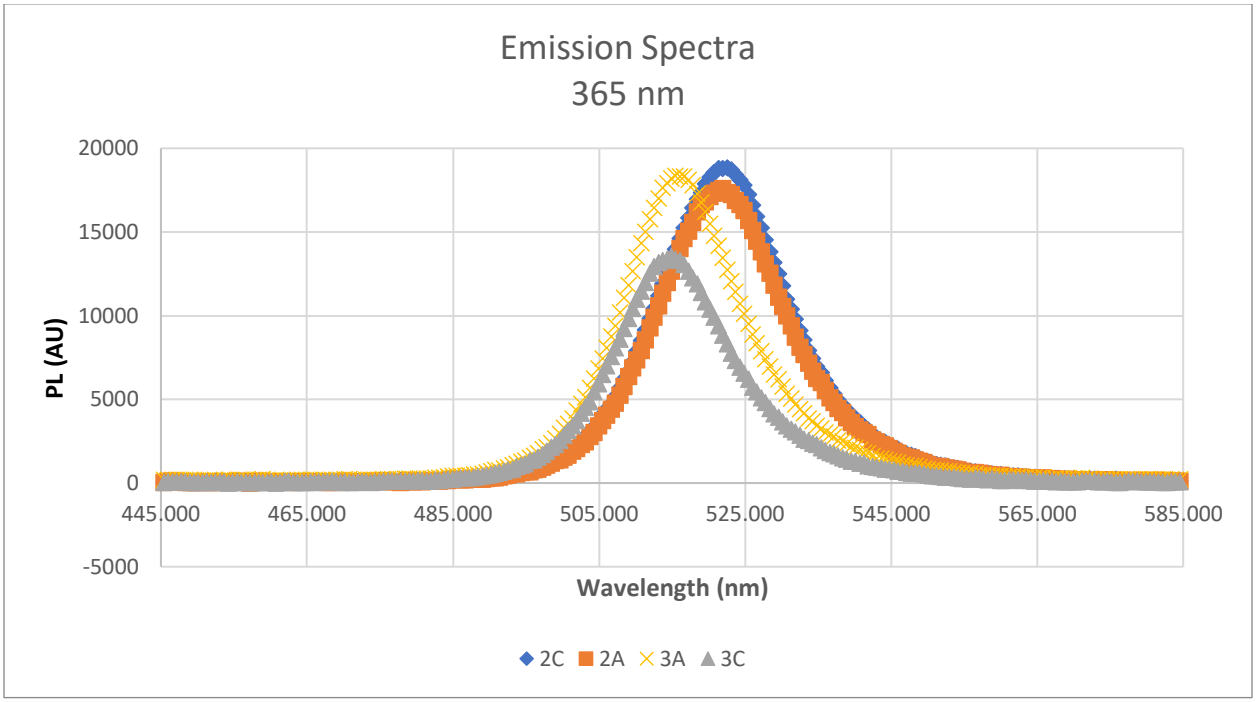
Fresh Sample (made 08/20/21)



Sample	Excitation peak (nm)
A2	521.941
C2	522.527
A3	515.484
C3	515.484

Sample made 08/20/21, data collected on 08/22/21

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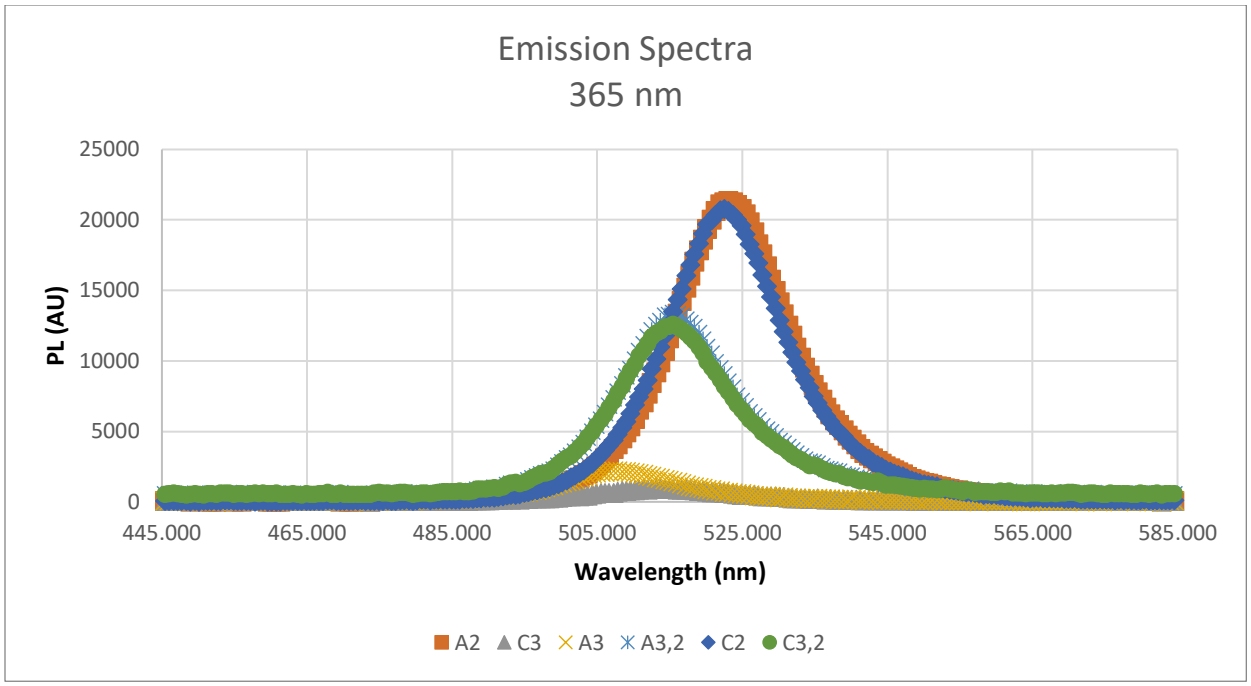
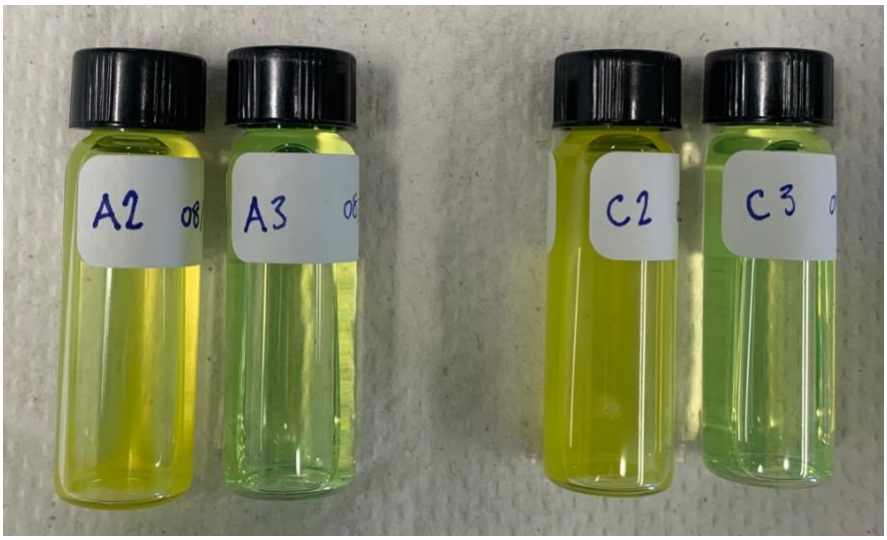
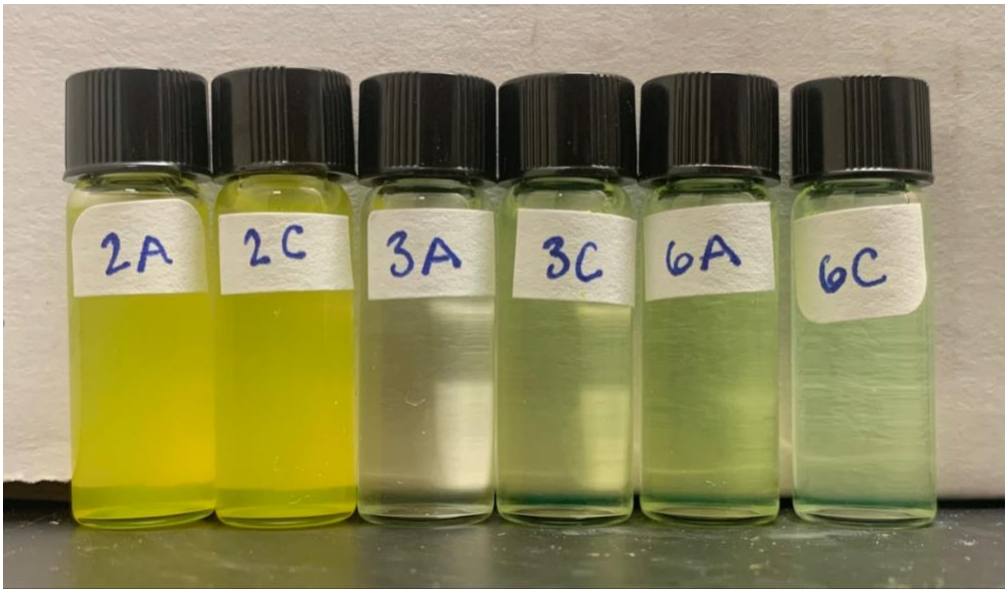


Sample	Excitation peak (nm)
A2	523.114
C2	521.941
A3	507.260
A3,2	515.484
C3	513.309
C3,2	515.484

Lithium Dubbed $CsPbBr_3$ Perovskite Nanocrystals

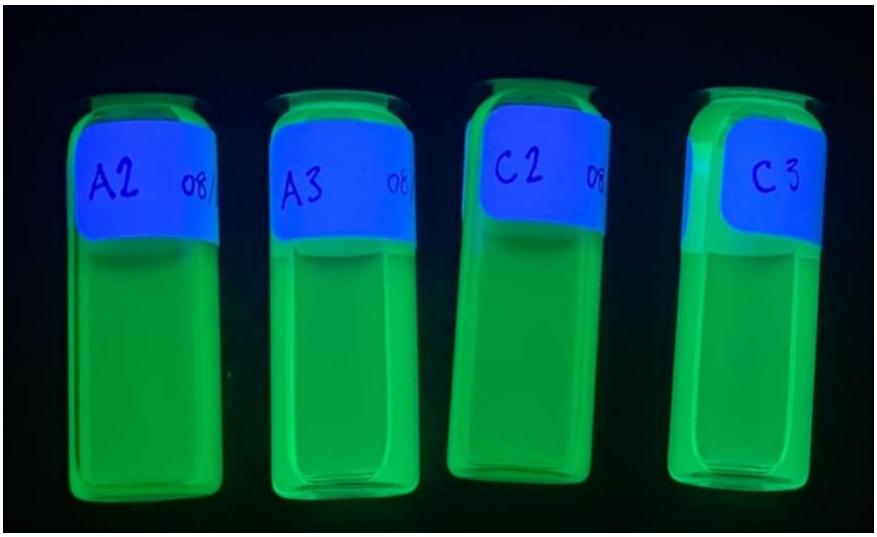


Set 2: day 2
Set 3: day 1
(08/11/21)

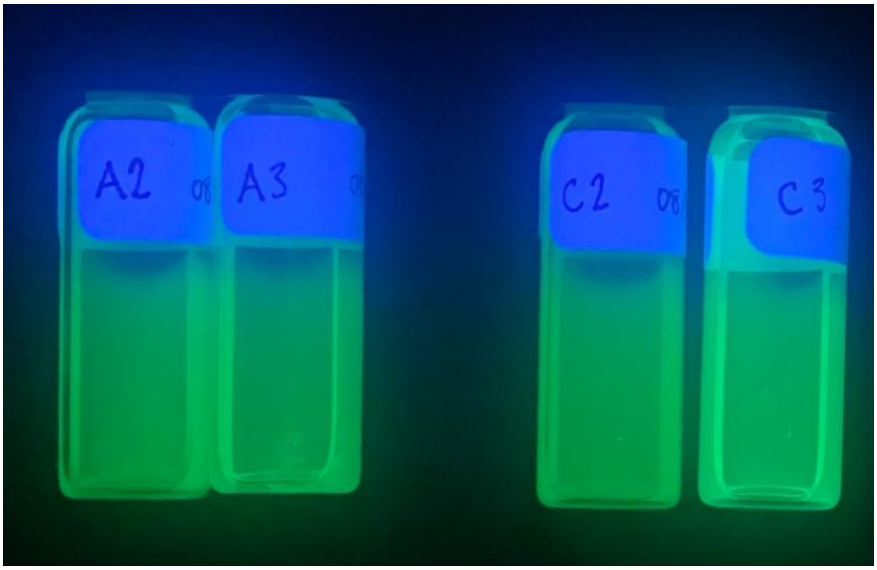


Set 2: day 12
Set 3: day 11
(08/22/21)

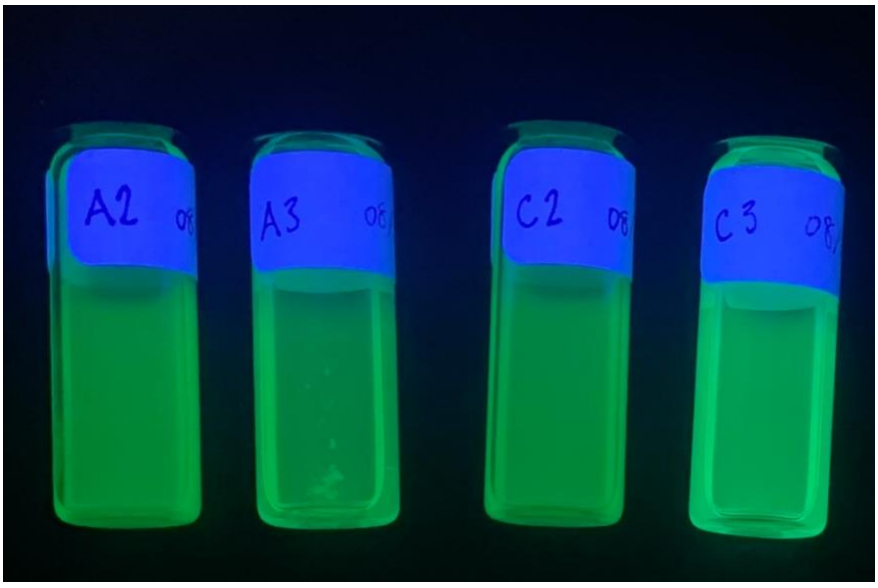
Lithium Dubbed $CsPbBr_3$ Perovskite Nanocrystals



Set 2: day 2
Set 3: day 1
(08/11/21)



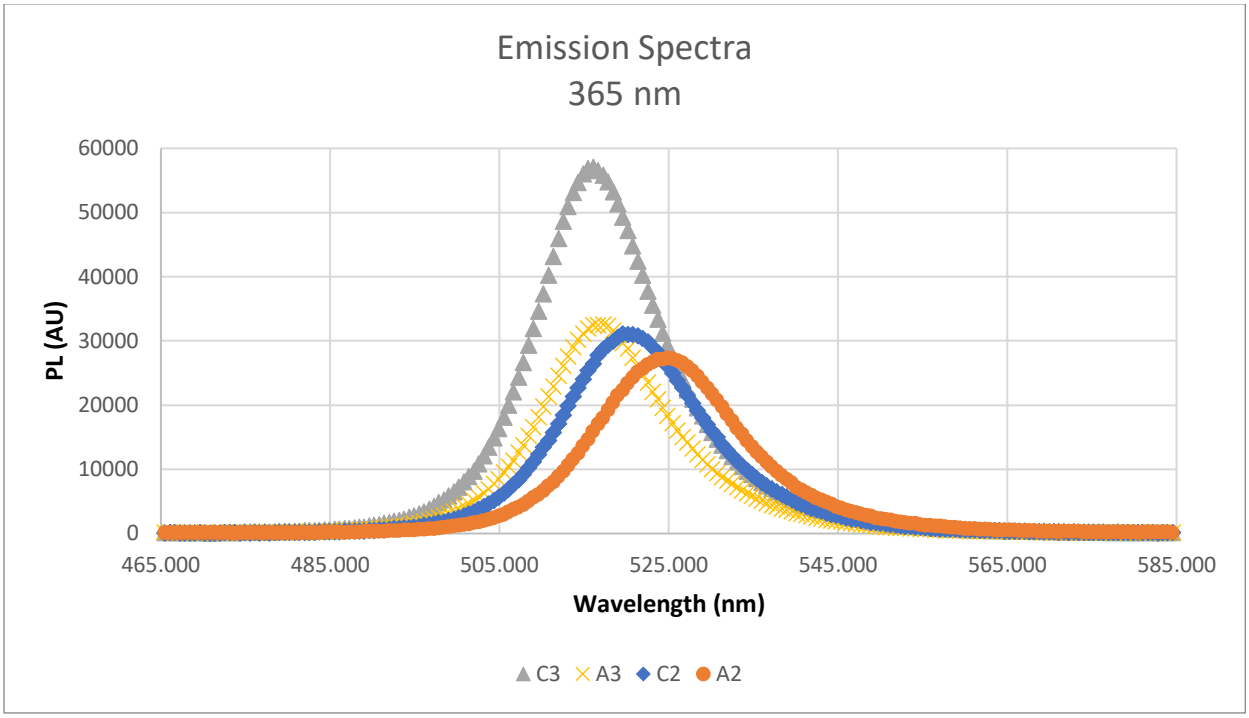
Set 2: day 8
Set 3: day 7
(08/18/21)



Set 2: day 12
Set 3: day 11
(08/22/21)

Lithium Dubbed $CsPbBr_3$ Perovskite Nanocrystals

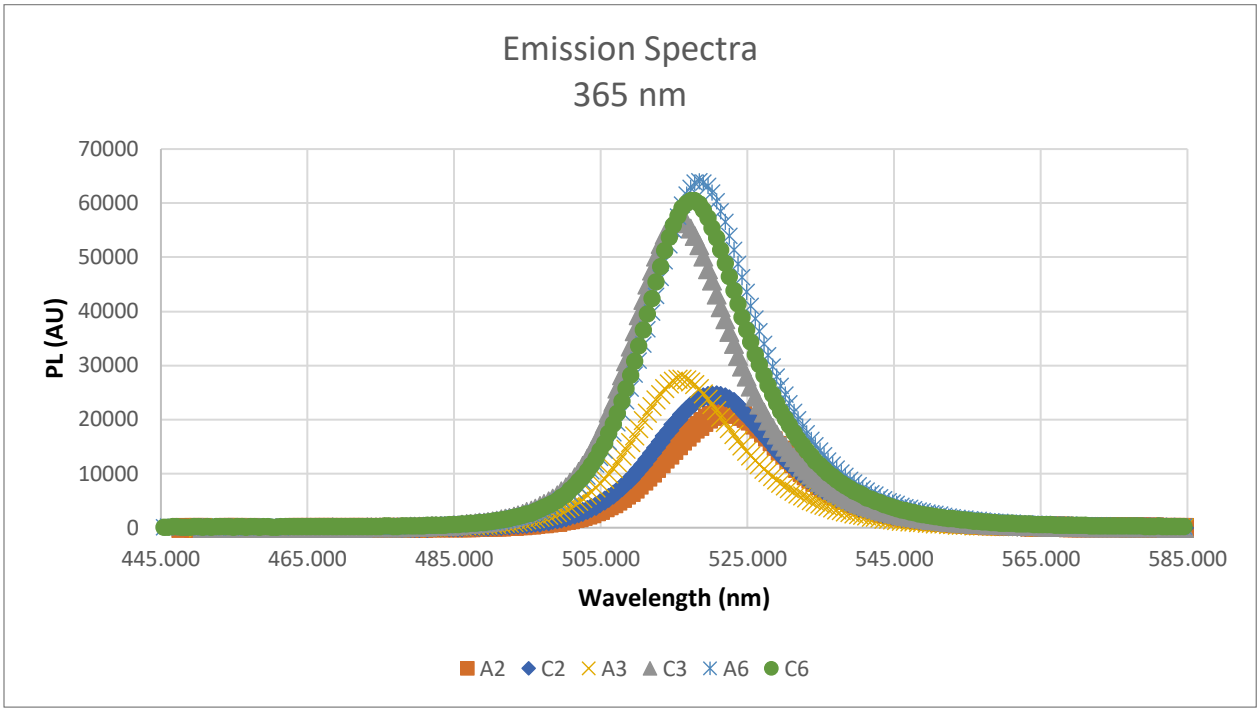
Sample made 08/10/21, data collected on 08/18/21 (samples shown in photos above)



Sample	Excitation peak (nm)
A2	521.941
C2	519.593
A3	517.245
C3	516.071

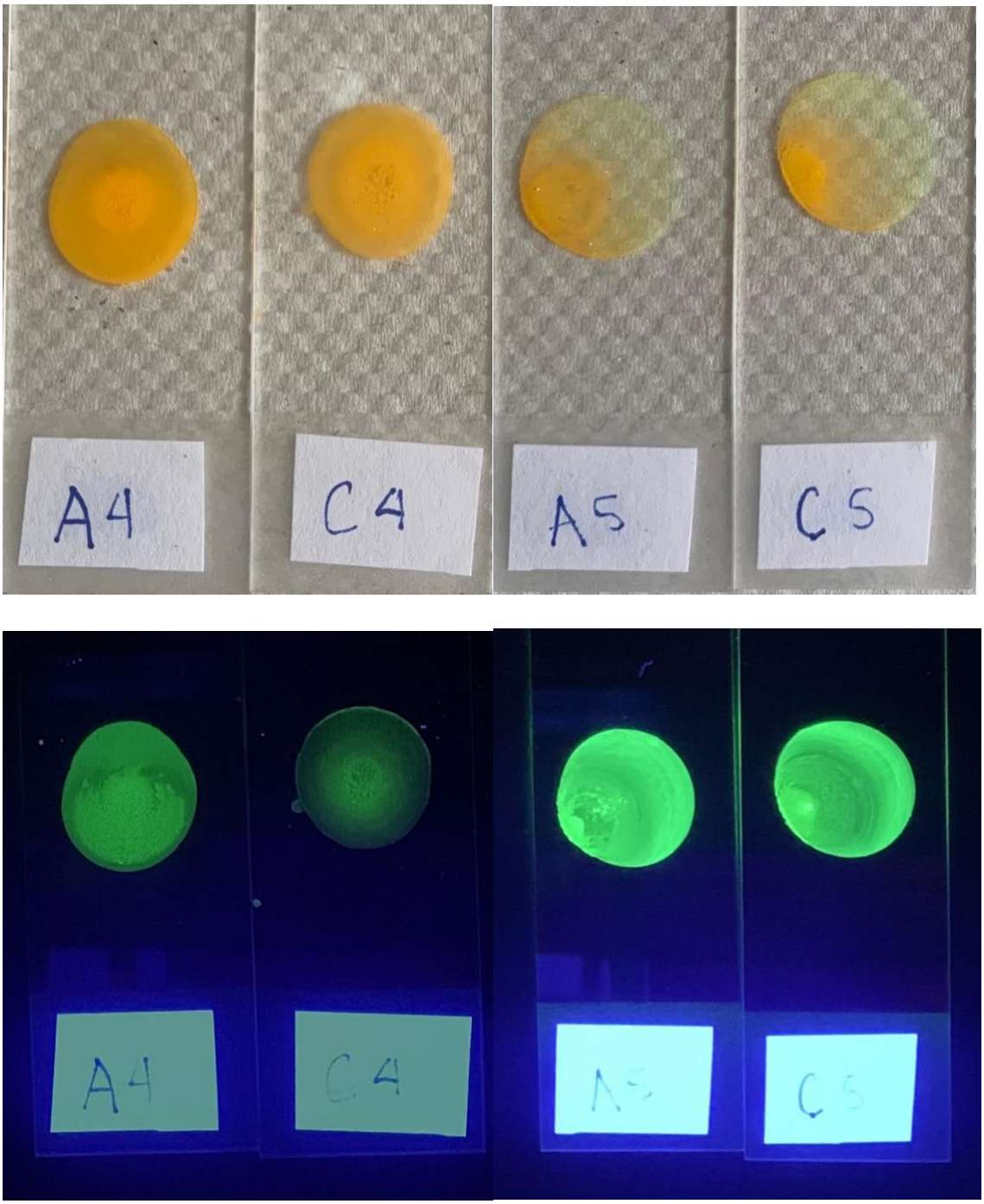
Lithium Dubbed $CsPbBr_3$ Perovskite Nanocrystals

Sample made 08/10/21, data collected on 08/22/21 (samples shown in photos above)



Sample	Excitation peak (nm)
A2	521.941
C2	520.180
A3	516.071
C3	515.484
A6	518.419
C6	517.832

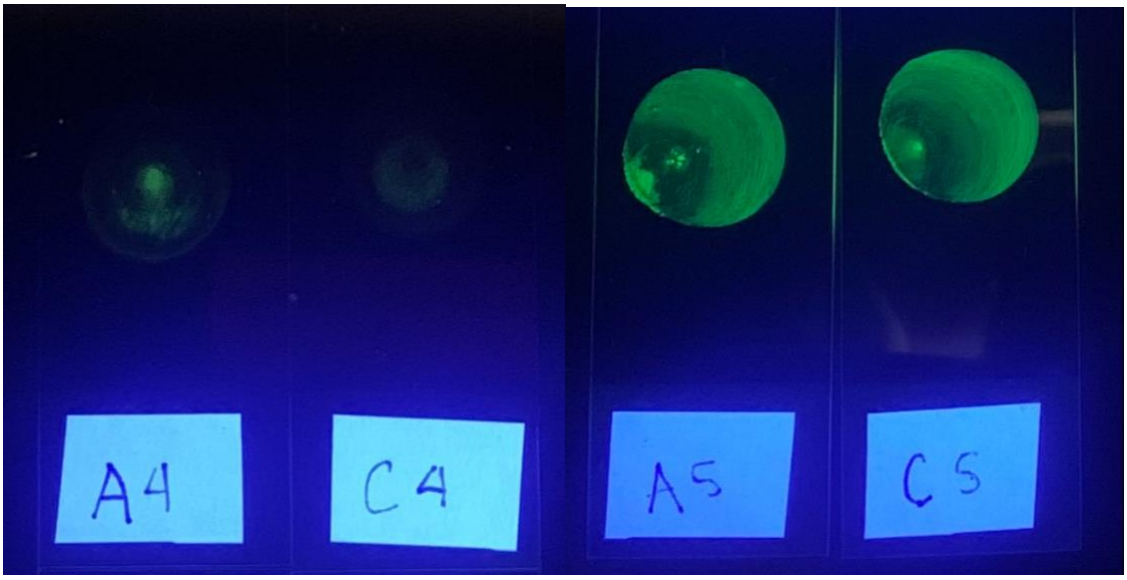
Lithium Dubbed $CsPbBr_3$ Perovskite Nanocrystals



Day 1

A4 C4 A5 C5

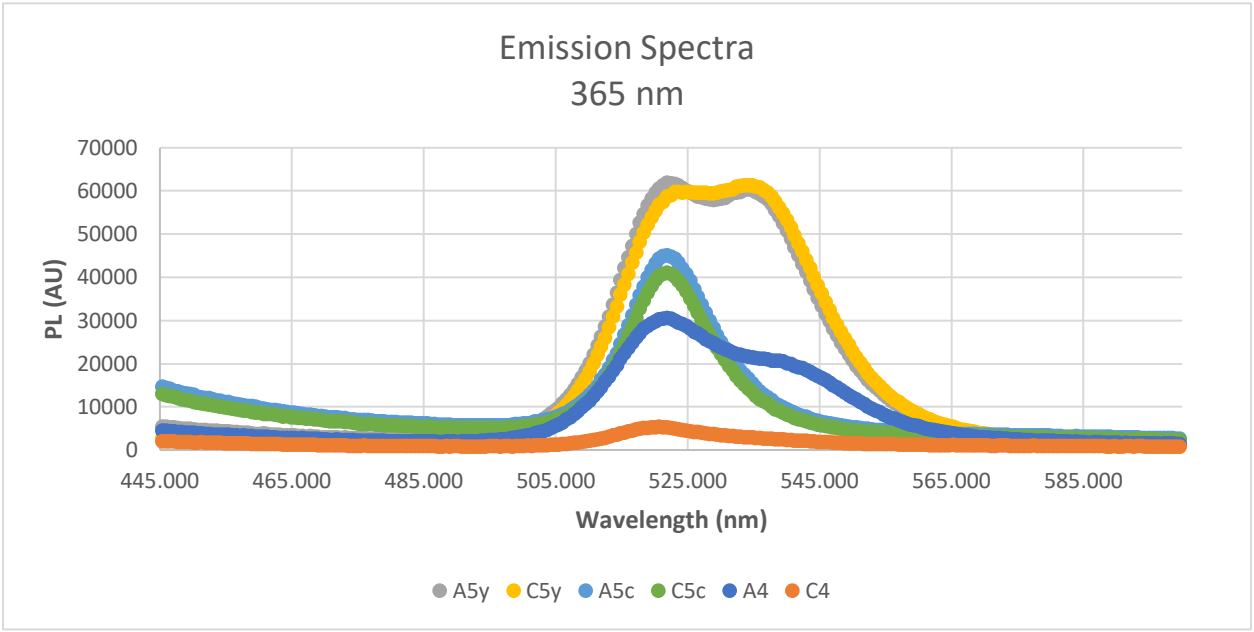
Lithium Dubbed $CsPbBr_3$ Perovskite Nanocrystals



Day 7

A4 C4 A5 C5

Sample made 08/10/21, data collected on 08/18/21 (samples shown in photos above)



Sample	Excitation peak (nm)	Excitation peak (nm)
A4	521.941	540.702*
C4	520.767	N/A
A5y	521.941	534.256
C5y	523.701*	534.256
A5c	521.941	N/A*
C5c	521.941	N/A

*Some of the maximum values of the peaks may be off due to overlapping of multiple peaks