

# Fluorescent Labels Based on the Aurone Scaffold: A Group Project

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## Introduction

### Goal:

- ❖ Synthesize a fluorescent, amine reactive probe that can be used to label proteins

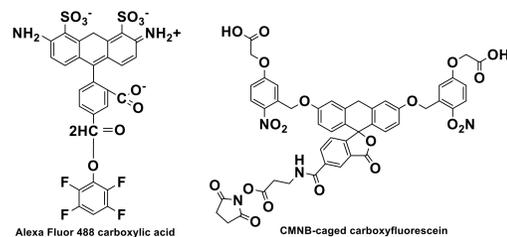
### Purpose:

- ❖ Preexisting commercially available probes are:
  - Expensive
  - Large in structure
  - Difficult to modify
  - Synthetically complex

### Aurone Advantages:

- Fluorescent
- Less expensive
- Smaller structure
- Short, modular synthesis

### Examples of commercially available fluorescent labels:



## Initial Idea

Reactive Label Color Control

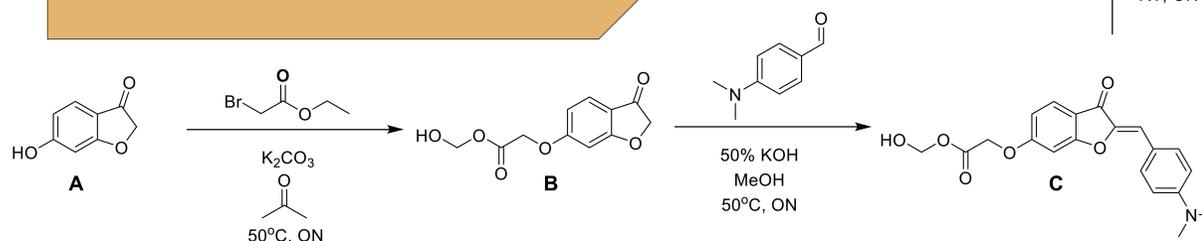
Three component fluorescent label with benzofuranone linkage

### Synthesis:

- Alkylation
- Condensation
- Activated Ester

### Problems:

- Does not precipitate well
- Poorly soluble in organic solvents



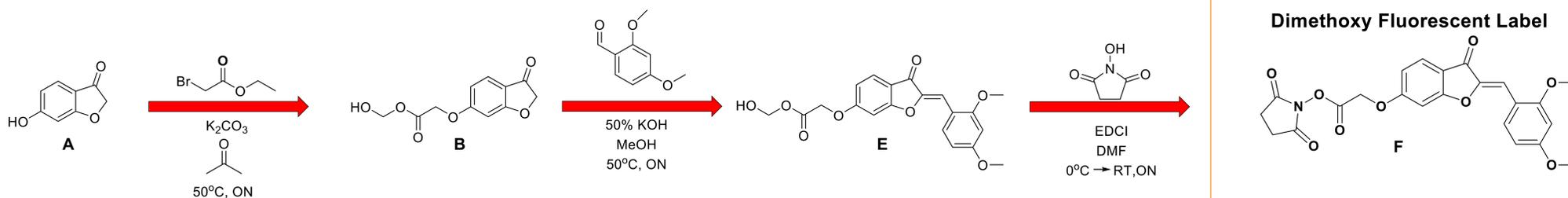
## Other Products Explored

Pyrole alternative label

Tri-phenyl amine alternative label

Both of these alternatives were explored to retain the strongly donating amino group, but hopefully improve organic solubility and product isolation. Unfortunately, they did not display improved solubility and proved no easier to isolate.

## Current Project



The current project mirrors the synthesis from our initial idea with the exception of a different aldehyde used in the condensation step. The dimethoxy molecule proved to give the product better organic solubility and made isolation of the activated ester F via precipitation easier while maintaining a useful value for UV/Vis and fluorescence. During this project, the aldehyde continues to be modified with the twin goals of modified absorption and emission spectra and ease of isolation.

## References

1. The Molecular Probes Handbook: A Guide to Fluorescent Probes and Labeling Technologies, 11<sup>th</sup> Edition (Molecular Probes, 2010).
2. Popova, A. V.; Bondarenko, S.P.; Frasnuyuk, M.S. Aurones: synthesis and properties. *Chem. Hetero. Comp.* **2019**, *55*, 285-299.
3. Moses, J.E.; Moorhouse, A.D. The growing applications of click chemistry. *Chem. Soc. Rev.* **2007**, *36*, 1249-1262.

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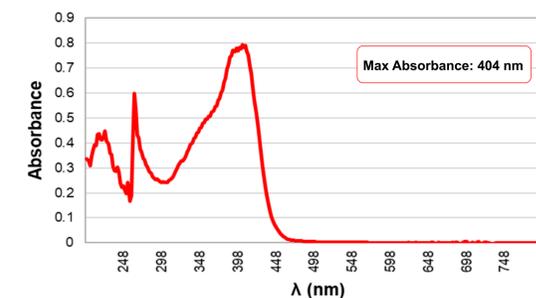
## Next Steps

React compound F with an amine

Use label in biochemical environment

## UV/Vis & Fluorescence

### UV/Vis Spectrum for Dimethoxy-N-Hydroxysuccinimide Fluorescent Label



### Fluorescence Spectrum for Dimethoxy-N-Hydroxysuccinimide Fluorescent Label

