Montague-CTE Scholar
Lei Fang (2017-18)
College of Science

Synthesis and Characterization of Quinacridone Dye Teaches a Set of Key Chemistry Concepts

- Imine Condensation
- Imine-Enamine Tautomerization
- Aromatization
- Friedel-Crafts Reaction
- Column Chromatography

Hydrogen bonding
- UV-vis Absorption
- Fluorescence
- Resonance Structures
- \( \pi \)-conjugation

Step I

Step II

Optical Properties Dependent on H-bonding Status

- "pyridine-4-one" (in diluted toluene)
- "pyridinium-4-olate" (in concentrated toluene)
- (in toluene with ethanol)

This experiment has been conducted for 3 semesters in course Organic Synthesis and Analysis IV (CHEM 234) at Texas A&M University, involving 80 students in total.

<table>
<thead>
<tr>
<th>Summary of Students’ Results</th>
<th>Post-Lab Quiz Question</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step I</td>
<td>Imine Condensation &amp; Aromatization</td>
<td>74</td>
</tr>
<tr>
<td>Step II</td>
<td>Friedel-Crafts Reaction</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>H-bonding &amp; Resonance</td>
<td>84</td>
</tr>
</tbody>
</table>

Success Rate (%) | Median Yield (%)
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74 | 35
89 | 29