Synergistic Gold and Iron Dual Catalysis: Preferred Radical Addition Toward Vinyl-Gold Intermediate Over Alkene

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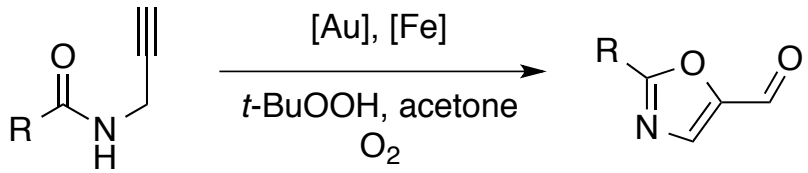
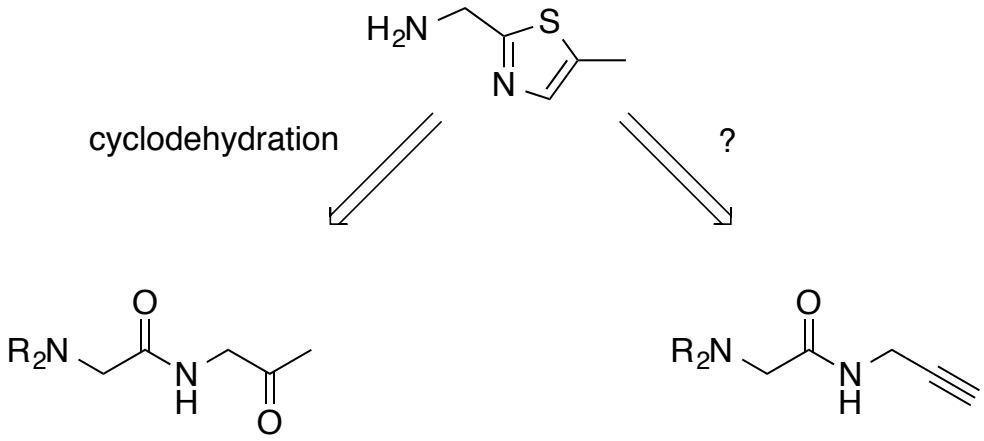


Why This Paper?



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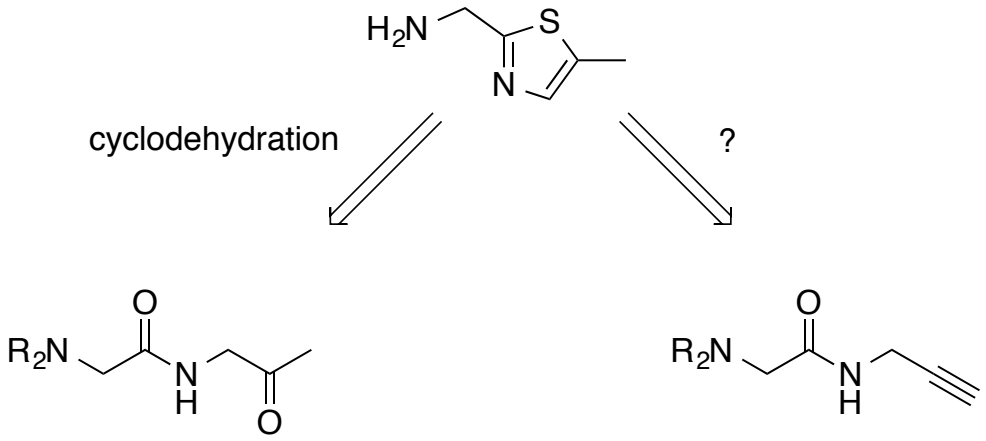

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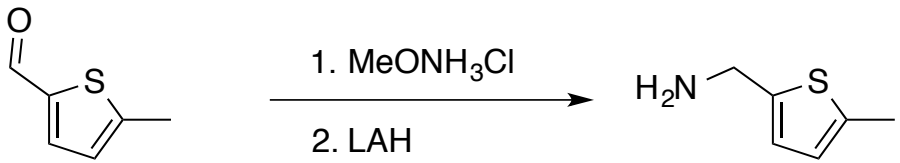
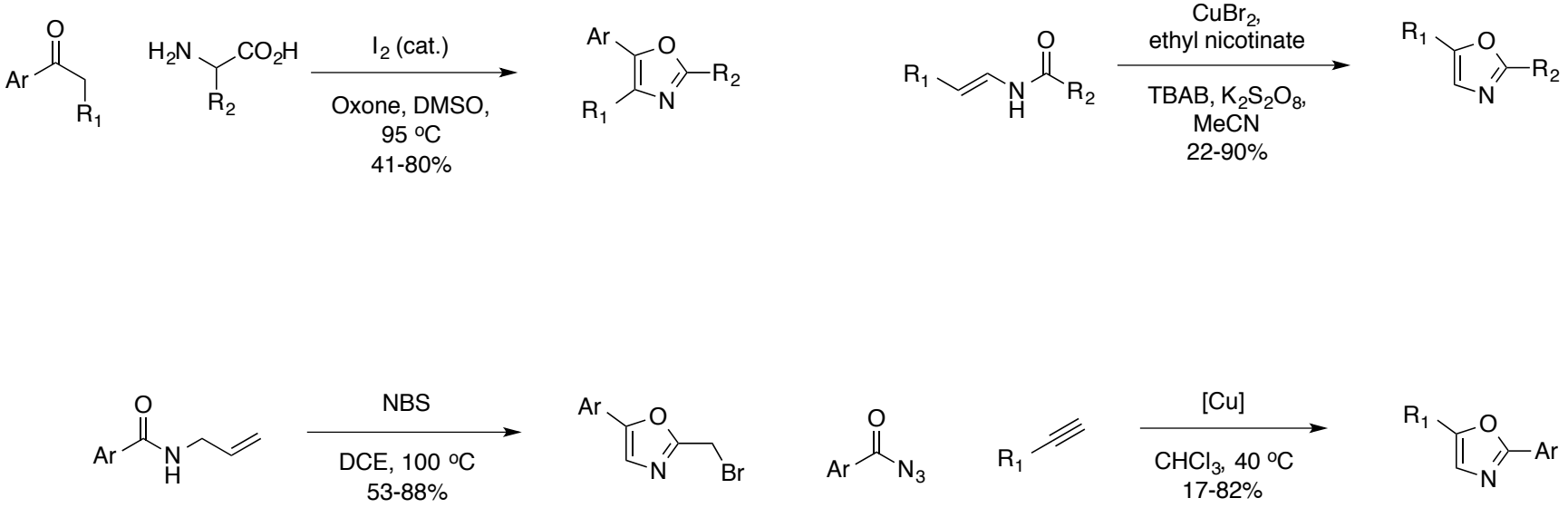


Selected Syntheses of 2-5-Disubstitued Oxazoles



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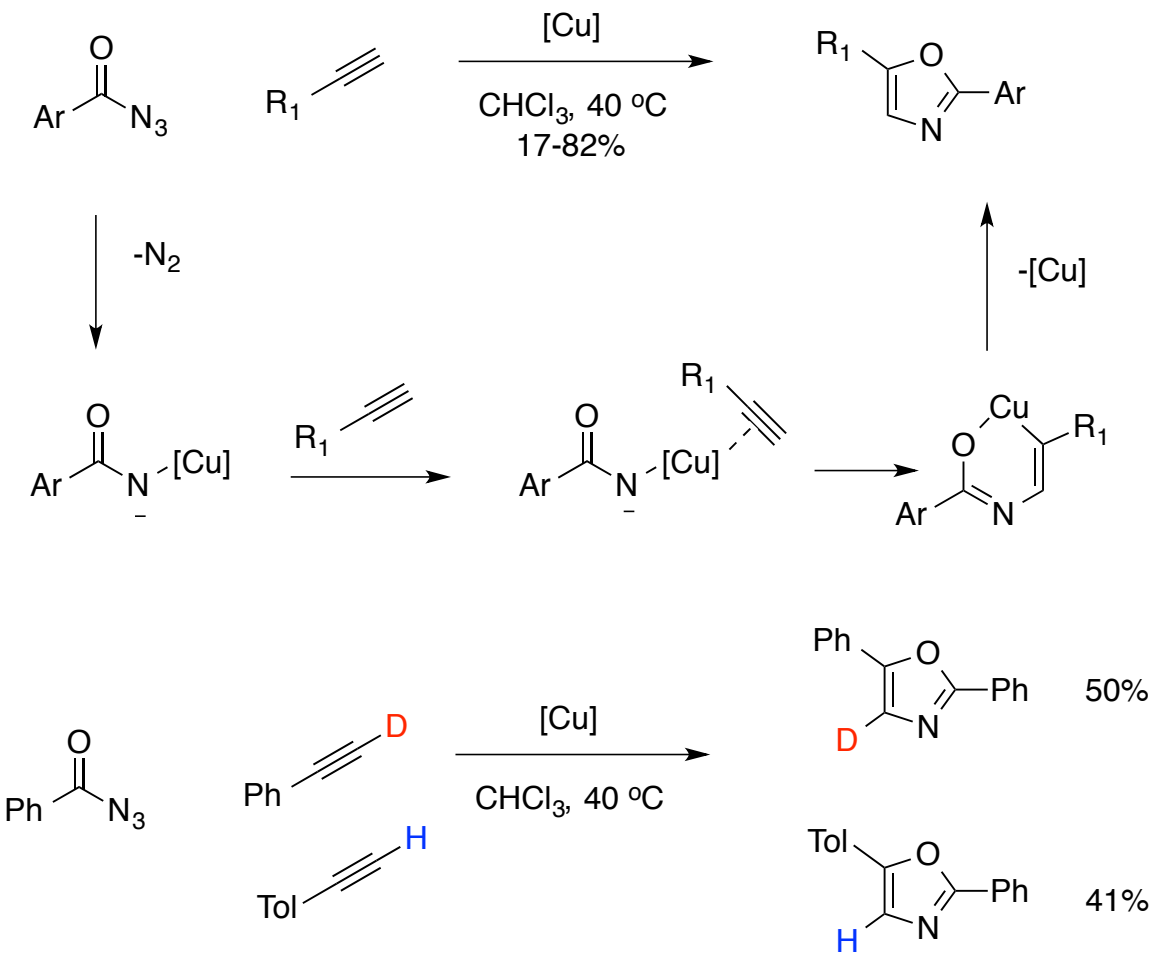
J. Am. Chem. Soc. **2011,** *133,* 191-193

Mechanism of Cu Catalyzed Oxazole Formation



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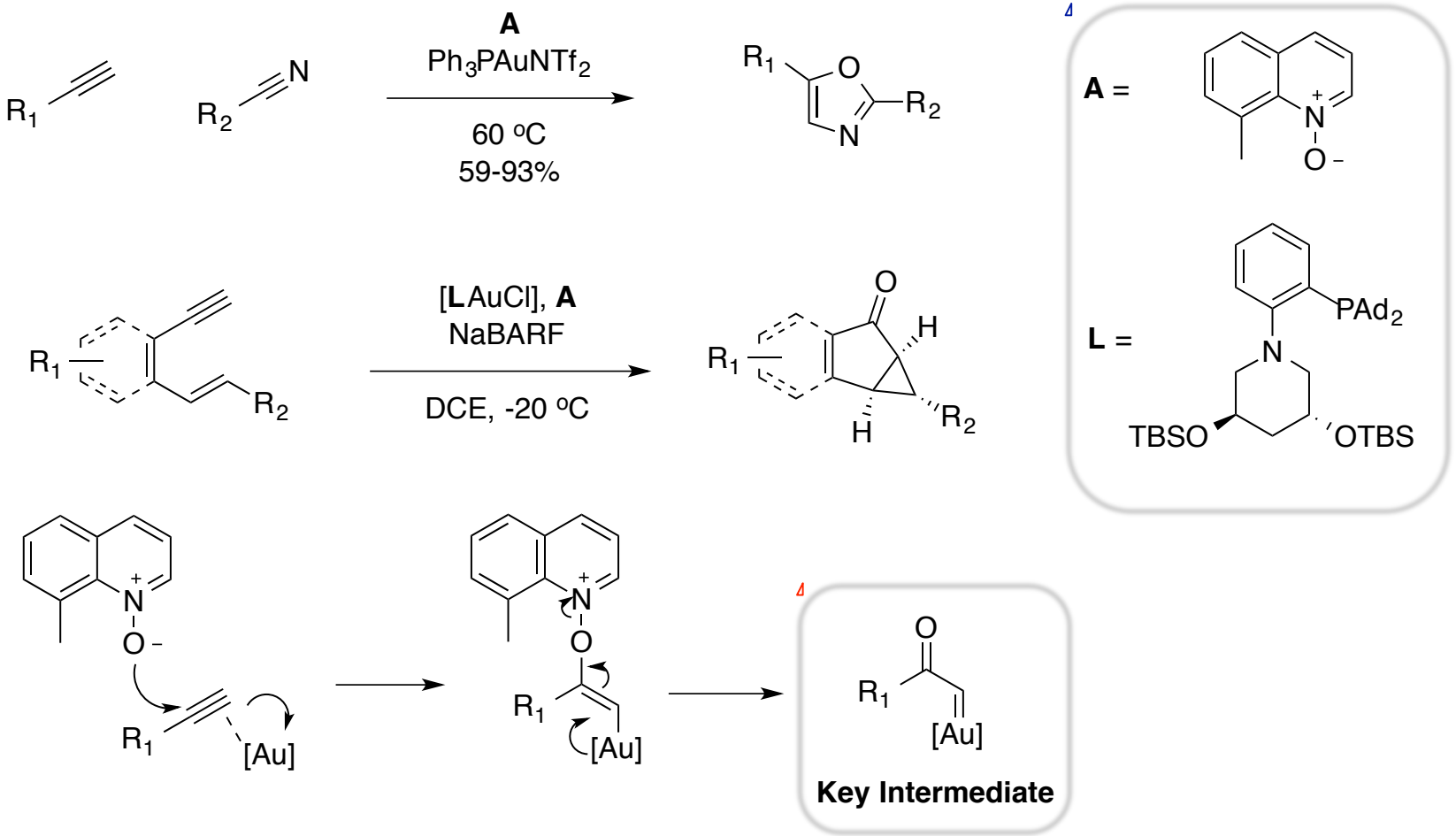
α-Oxo Gold Transformations



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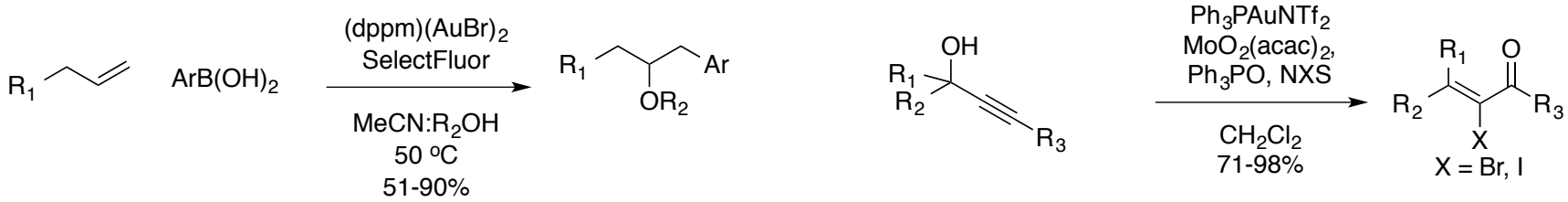
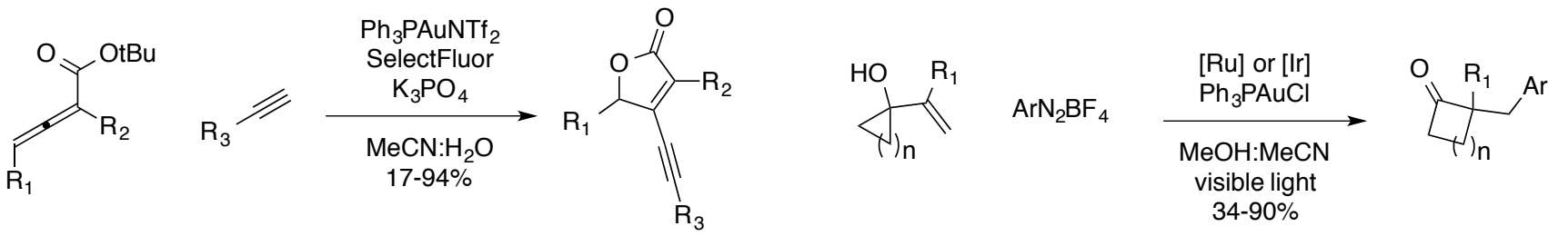
Tandem Gold Catalyzed Reactions





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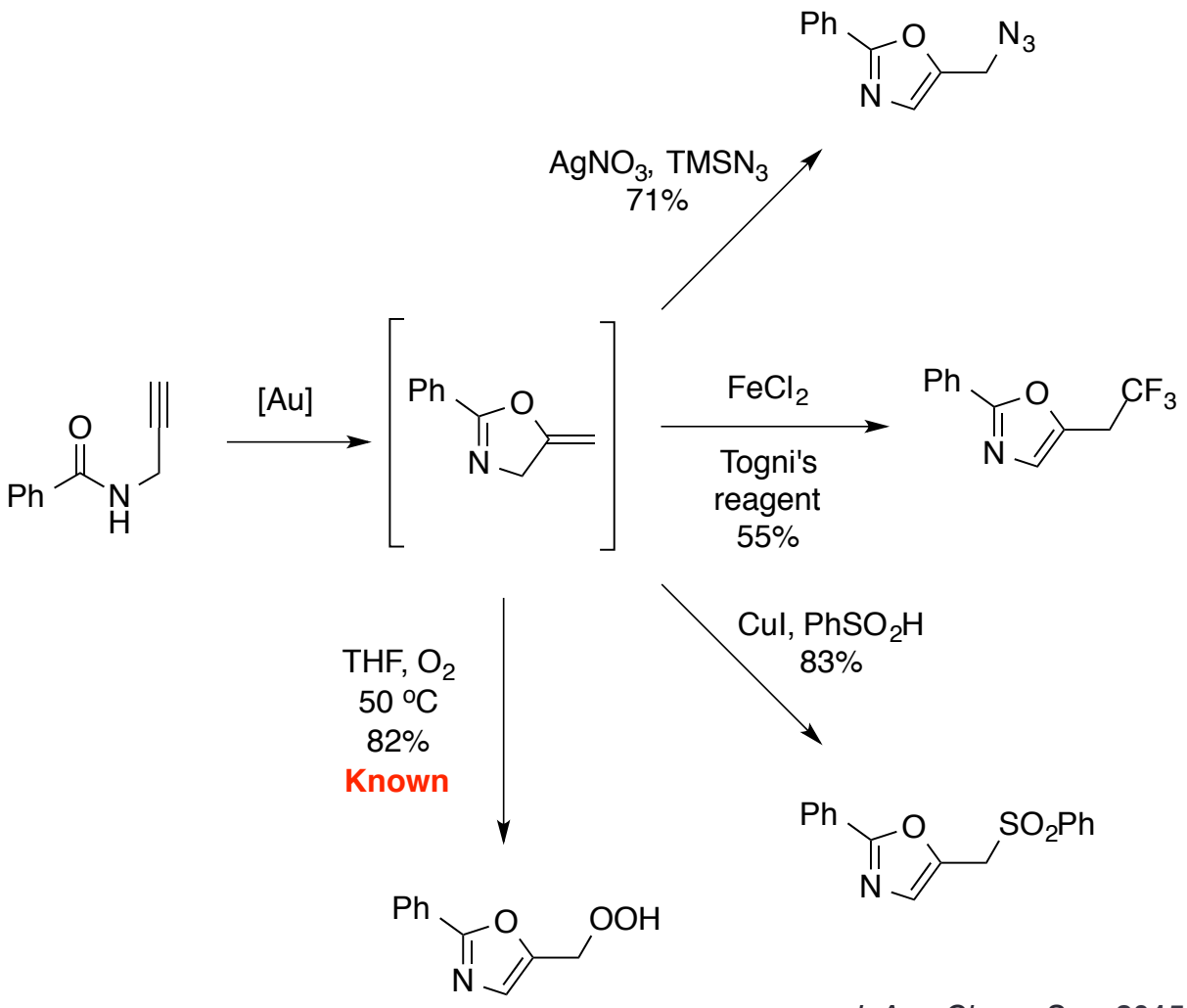
Title Paper: Three Preliminary Transformations



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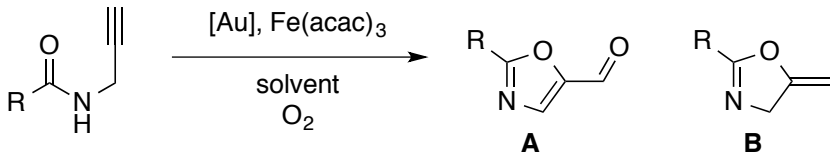
Title Paper: Screening of Conditions



Entry	[Au]	Solvent	TIme (h)	Conv. (%)	Yield (%**A**:**%B**)
1	$Ph_3PAuNTf_2$	MeCN	12	<10	0:0
2	iPrAuNTf$_2$	MeCN	8	100	<10:85
3	di*t*BuXPhos AuNTf$_2$	MeCN	8	100	17:65
4	di*t*BuXPhos Au(MeCN)SbF$_6$	MeCN	8	100	33:45
5	$(ArO)_3PAuNTf_2$	MeCN	8	100	11:58
6	JackiePhosAuNTf$_2$	MeCN	8	100	15:71
7	$Ph_3PAuNTf_2$	acetone	8	100	43:38
8	$Ph_3PAuNTf_2$	CH_2Cl_2	8	100	25:65
9	$Ph_3PAuNTf_2$	PhMe	8	100	29:69
10	$Ph_3PAuNTf_2$	Dioxane	8	100	45:38
11*	$Ph_3PAuNTf_2$	acetone	2	100	83:--

* 50% *t*-BuOOH

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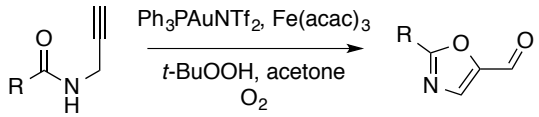
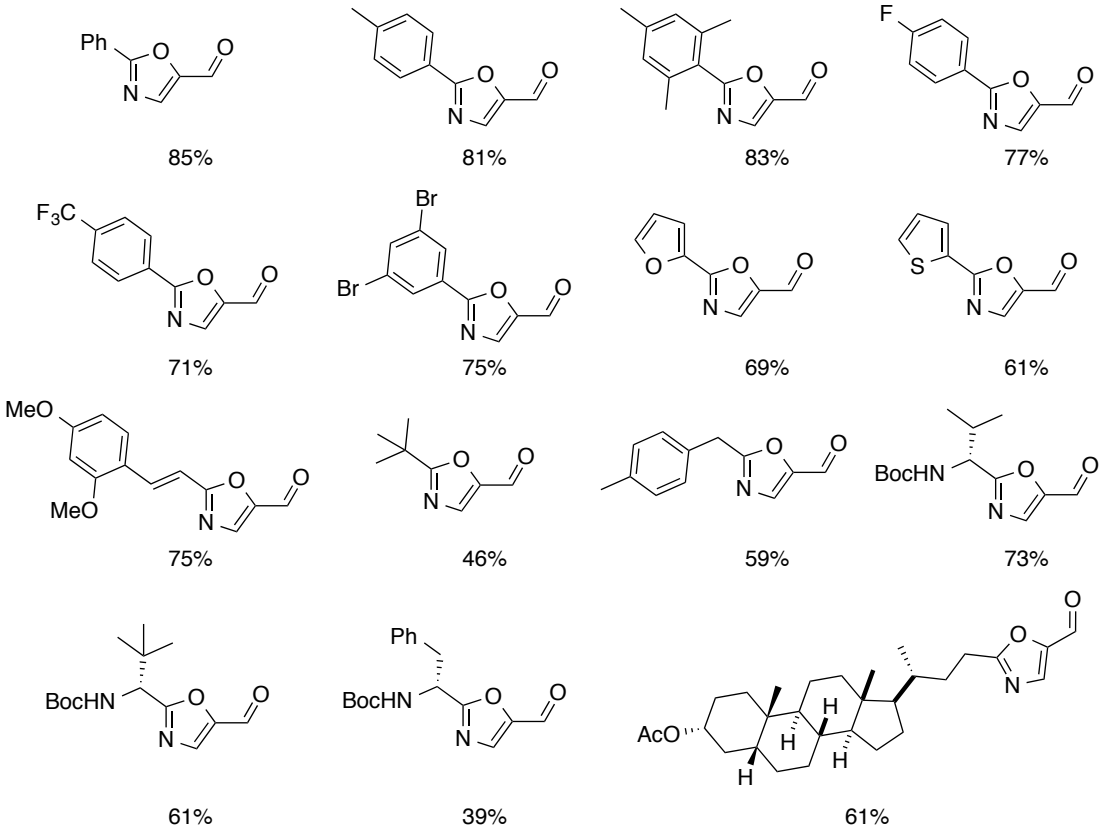
Title Paper: Reaction Scope





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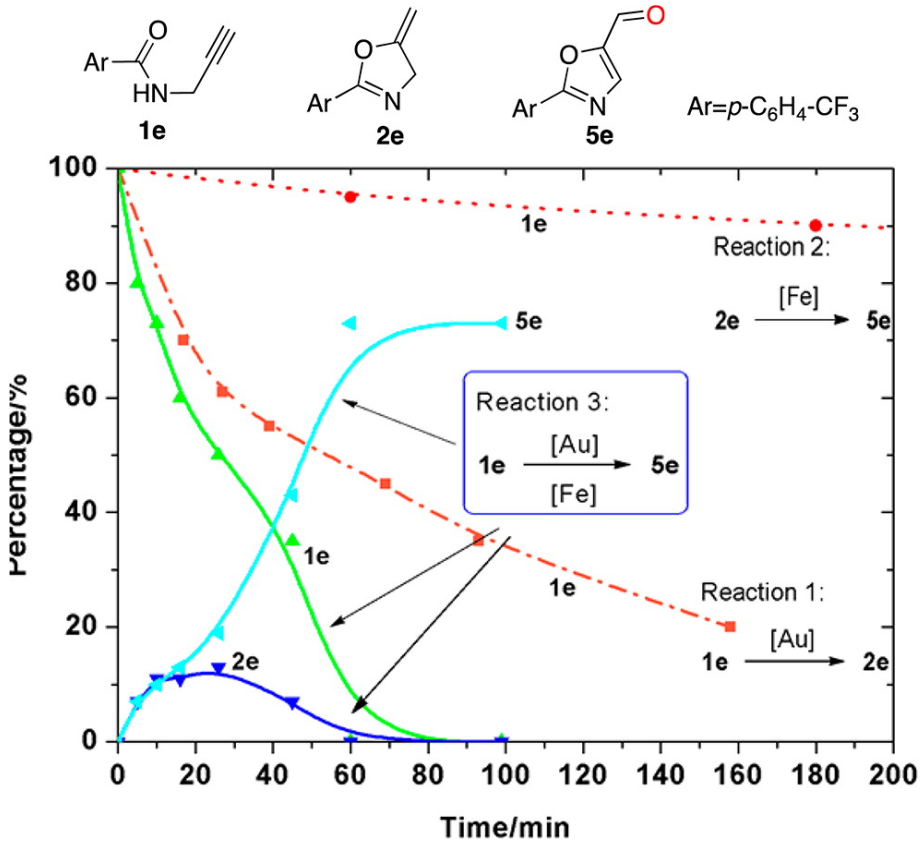
Synergistic or Sequential Catalysis?



- Slow conversion of **2e** to **5e** with $Fe(acac)_3$
- Slow conversion of **1e** to **5e** with $Ph_3PAuNTf_2$
- **1e** to **5e** faster with [Au] and [Fe]
- Suggests that [O] occurs on vinyl Au, not alkene

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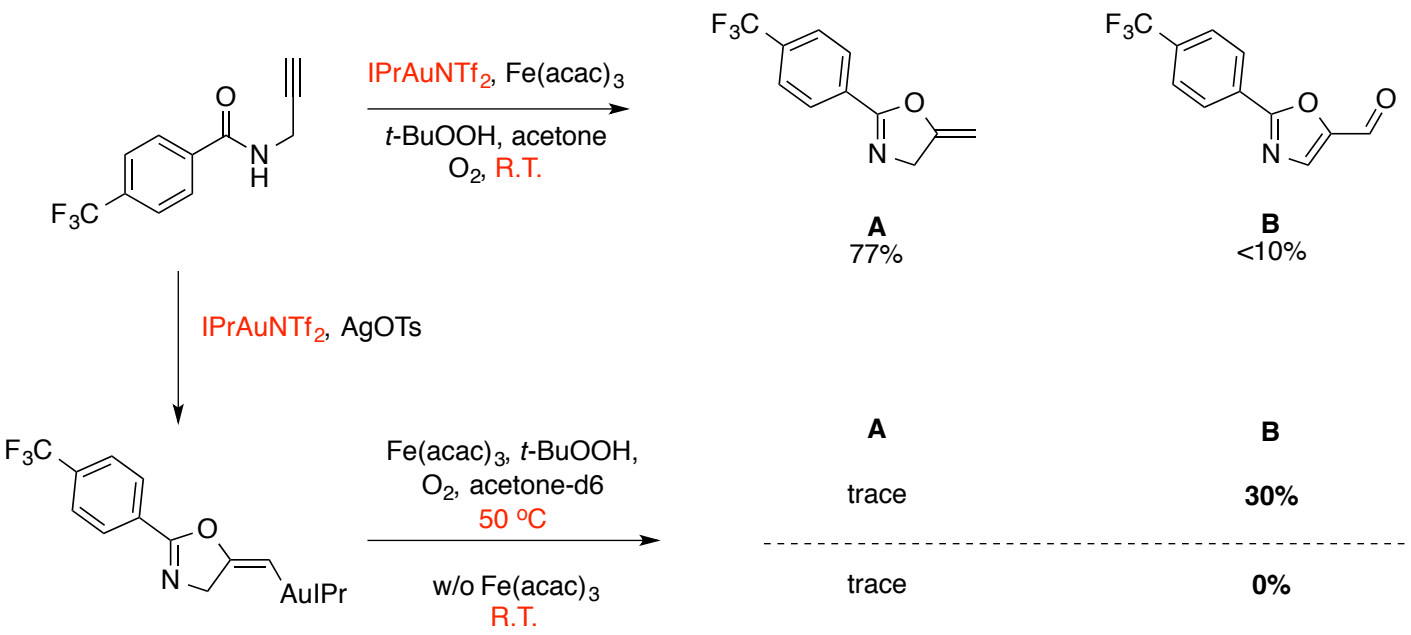
Competency of Vinyl Gold Intermediate



- $Ph_3PAuNTf_2$ analog not isolable
- 1 eq. TEMPO inhibits reaction
- Questionable reaction temperatures

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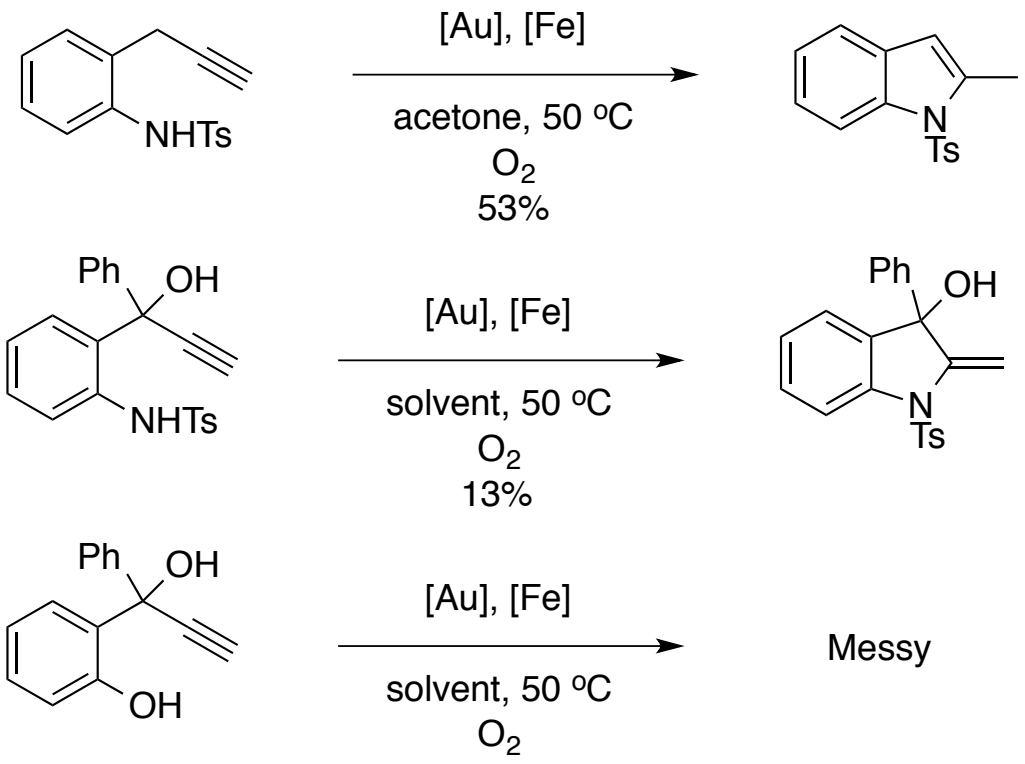
Slow Protodeauration?



"The major challenge for this synthetic route was the slow protodeauration, which led to the poor yields of the cyclizaiton products."

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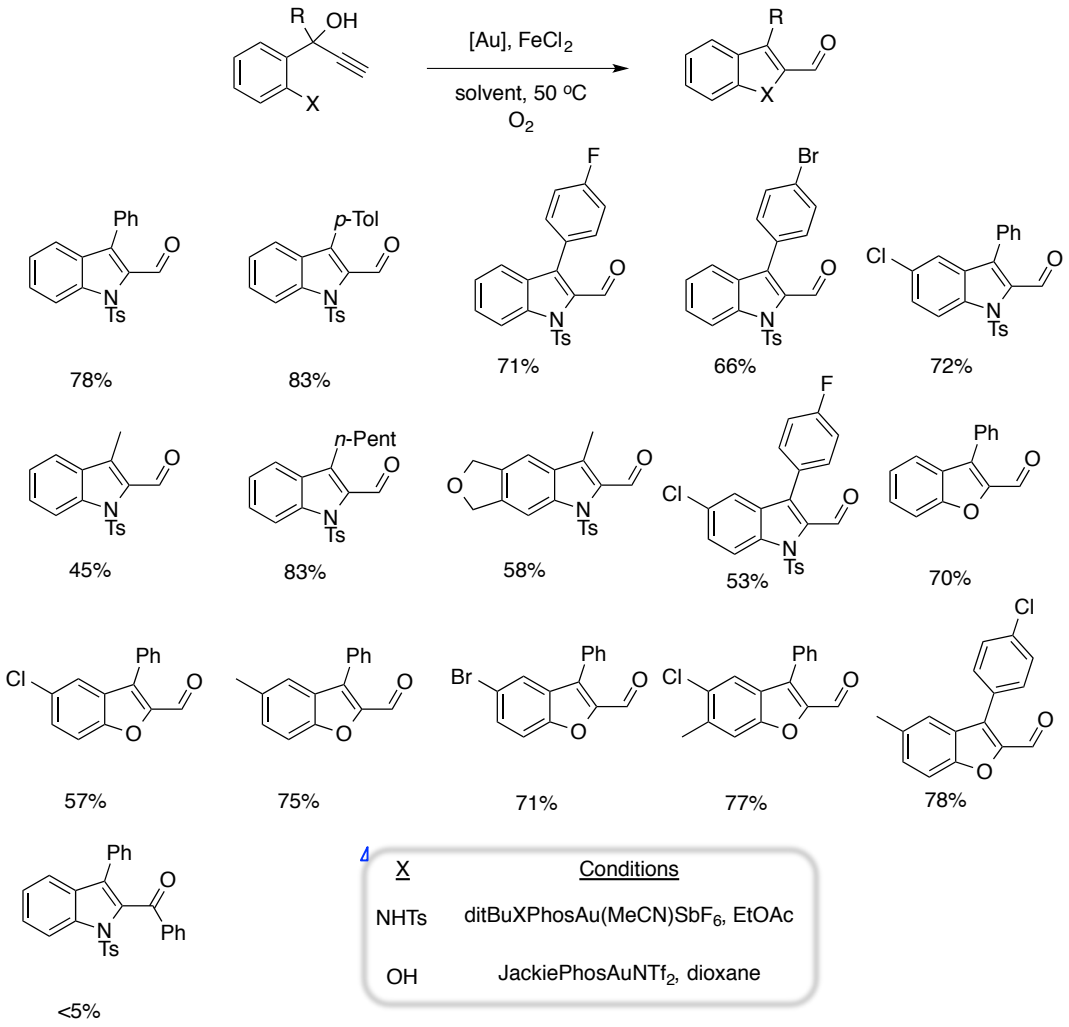
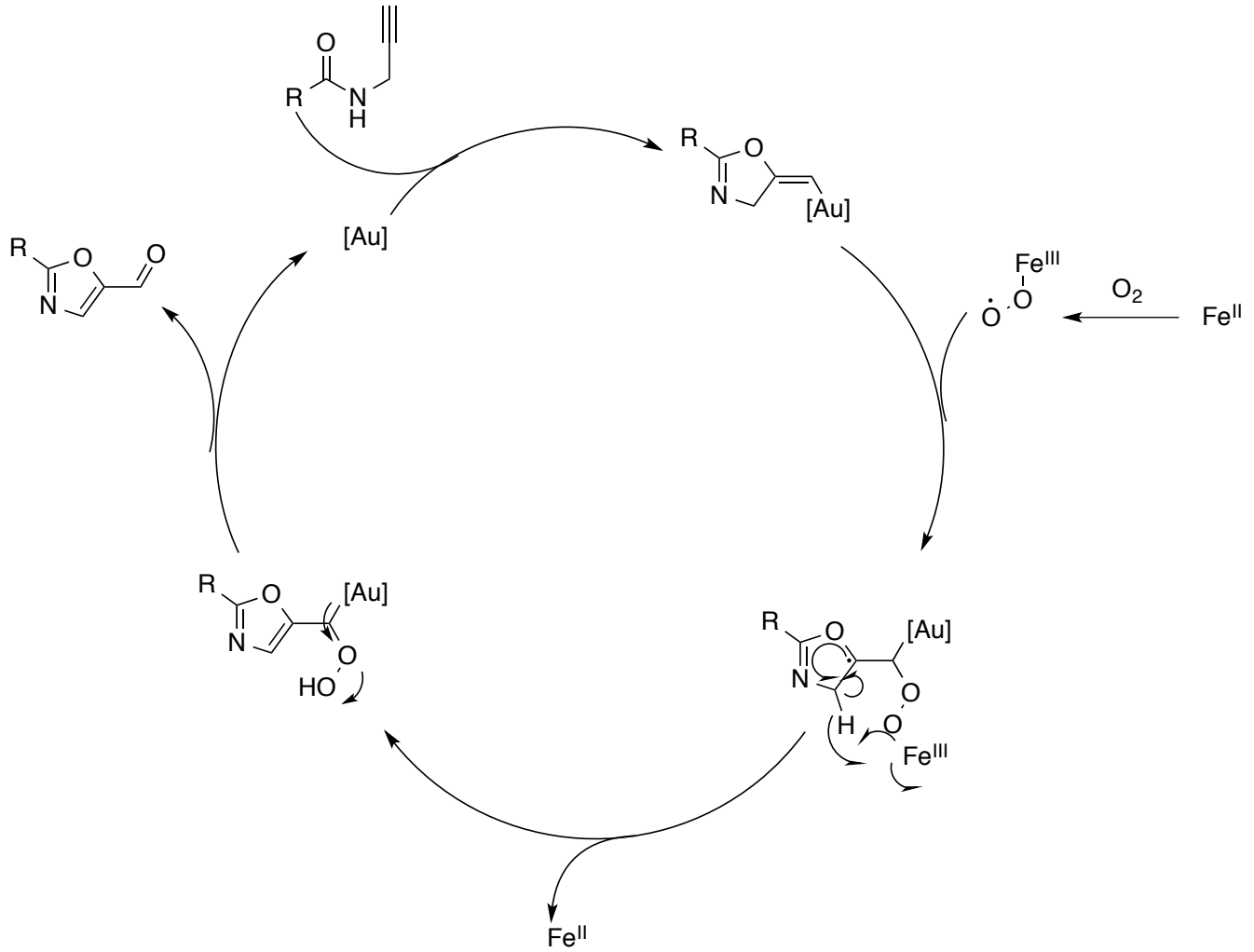
Indole and Benzofuran Scope



Proposed Mechanism



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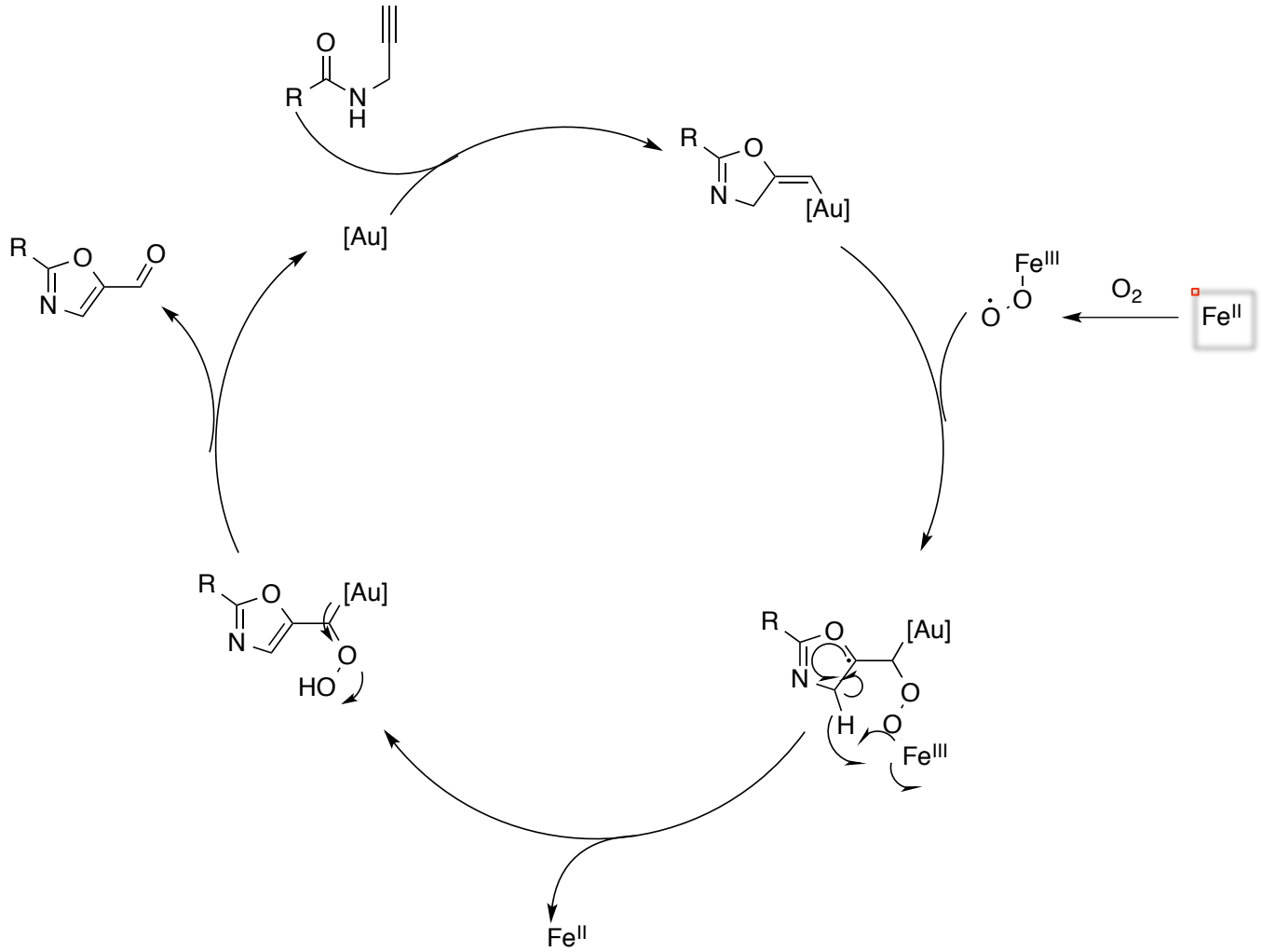
Proposed Mechanism



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Conclusions

- Experiments suggest oxidation of a vinyl gold intermediate
- Sloppiness of the rest of the paper and supporting information raises questions about what was done and why