



# The literature report

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2013/6/3

# Iridium-Catalyzed Borylation of Secondary Benzylic C–H Bonds Directed by a Hydrosilane

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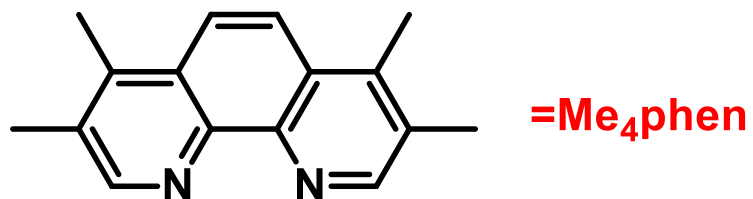
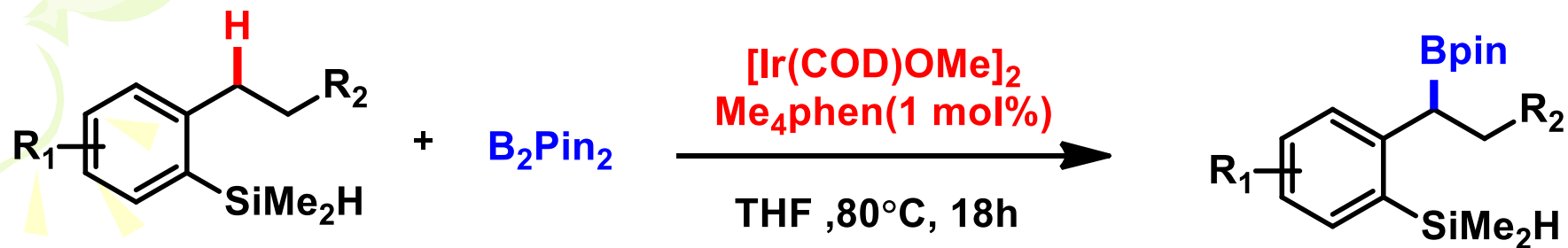


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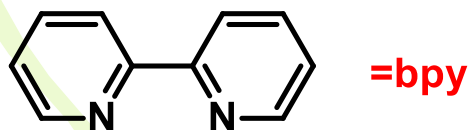
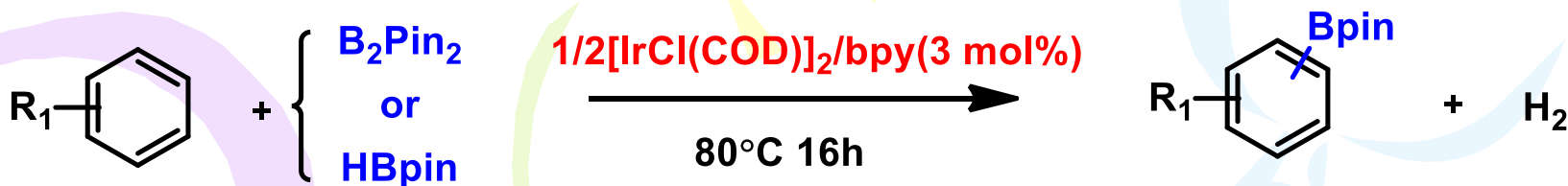
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# Nondirected $sp^2$ C-H borylations

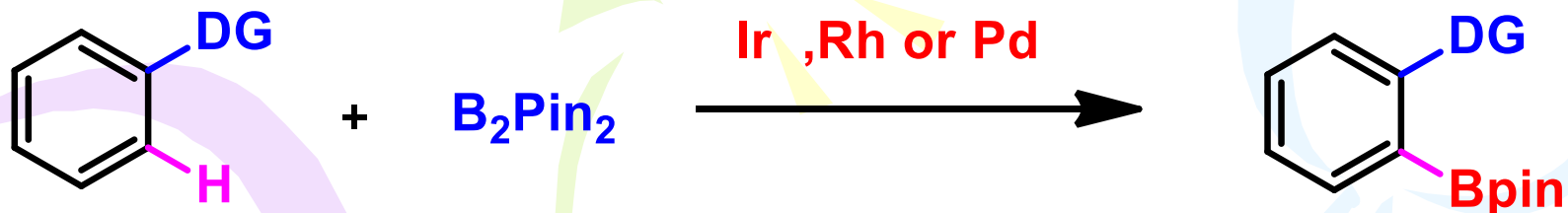


*J. Am. Chem. Soc.* **2000**, 122, 12868.

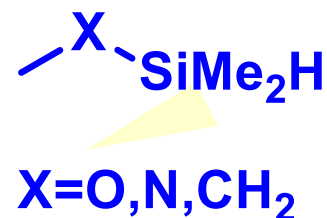
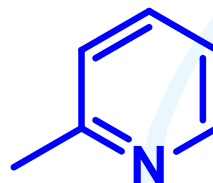
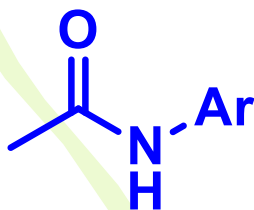
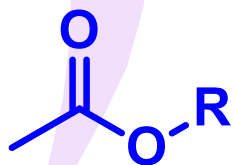
*J. Am. Chem. Soc.* **2002**, 124, 390.

# Significant progress on the borylation of $sp^2$ C–H bonds

## Directed $sp^2$ C–H borylations



DG=



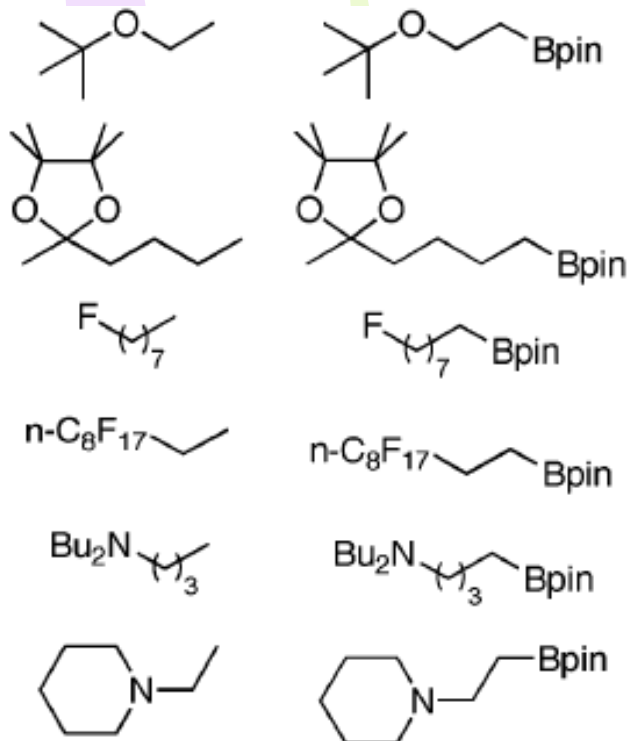
- J. Am. Chem. Soc.* **2009**, 131, 5058.  
*J. Am. Chem. Soc.* **2011**, 133, 19310.  
*J. Am. Chem. Soc.* **2012**, 134, 134.  
*J. Am. Chem. Soc.* **2008**, 130, 7534  
*Angew. Chem., Int. Ed.* **2011**, 50, 11724.  
*Chem. Commun.* **2010**, 46, 159.

# Significant progress on the borylation of $sp^3$ C–H bonds

## Primary C-H borylations

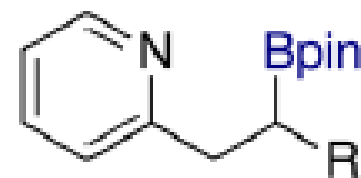
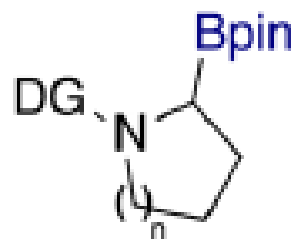
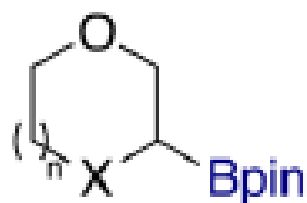


## Terminal Borylation of Heteroatom-Containing Substrates



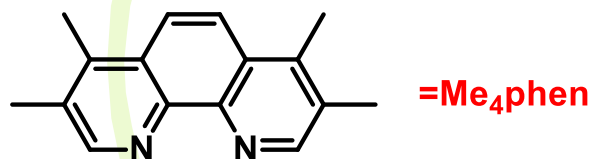
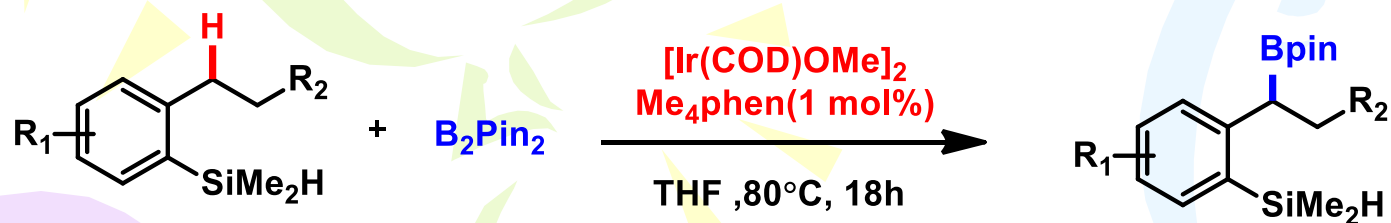
# Significant progress on the borylation of $sp^3$ C–H bonds

## Secondary C-H borylations

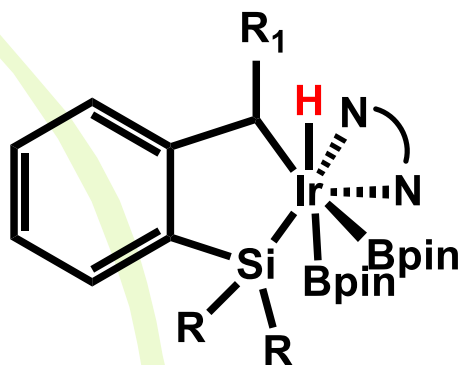


*J. Am. Chem. Soc.* **2012**, *134*, 1242.  
*J. Am. Chem. Soc.* **2013**, *135*, 3375.  
*J. Am. Chem. Soc.* **2012**, *134*, 12924.  
*J. Am. Chem. Soc.* **2013**, *135*, 2947.

# This Work: Silyl-directed secondary ( $sp^3$ ) C-H borylation



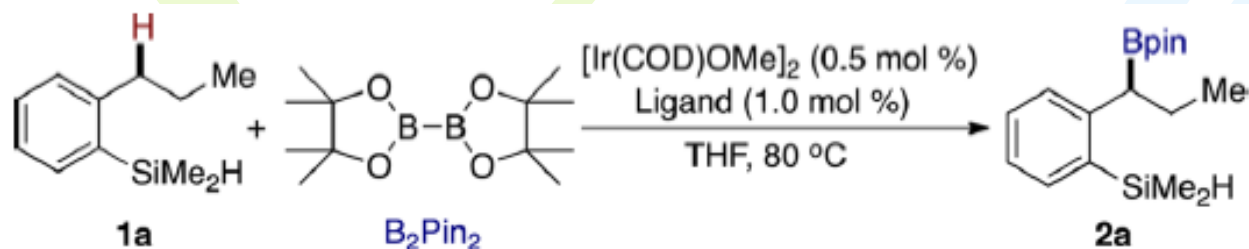
*likely via*



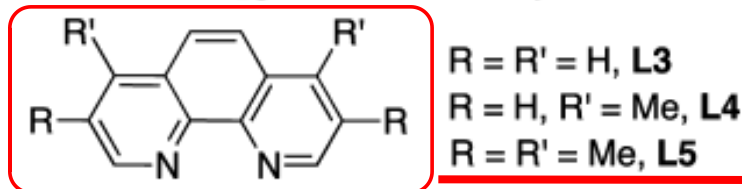
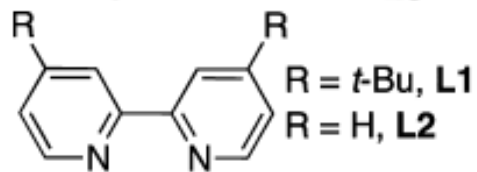
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# Effect of the Bipyridine Ligand on the Catalytic Borylation of Benzylic C–H bonds



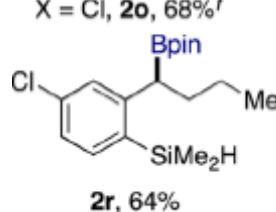
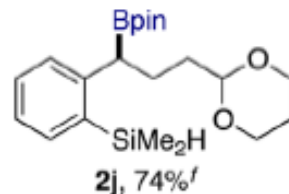
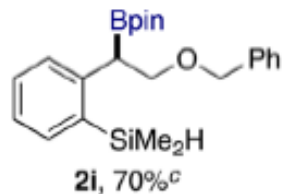
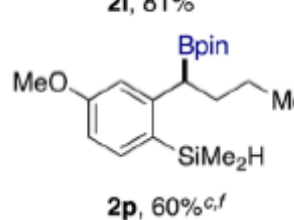
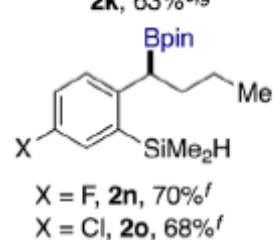
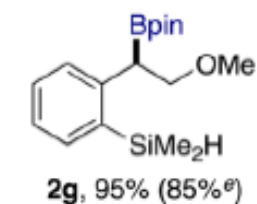
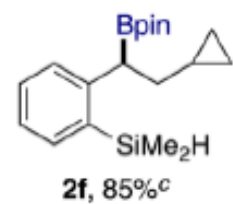
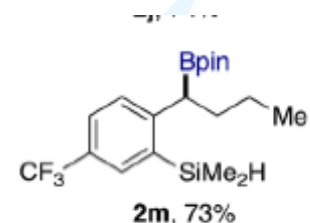
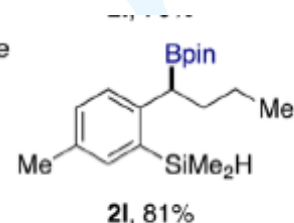
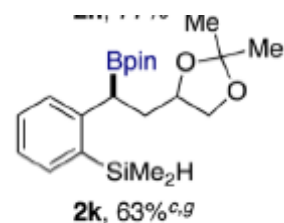
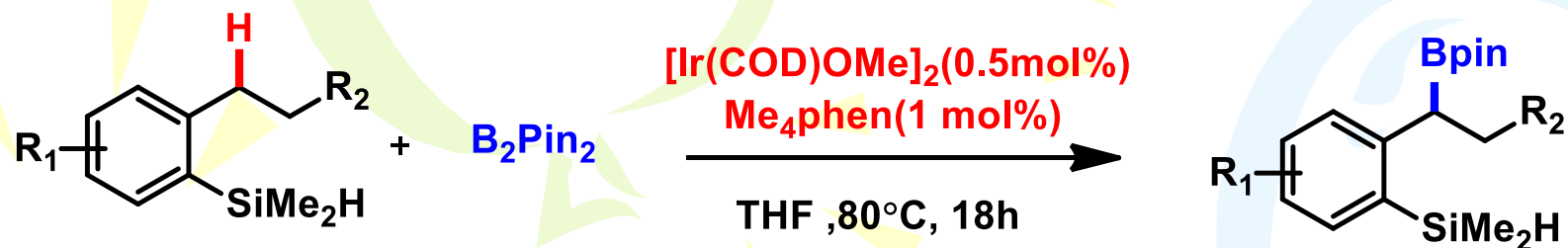
entry	ligand	conv (%)	yield (%) <sup>b</sup>
1	L1	90	83
2	L2	80	61
3	L3	90	85
4	L4	94	89
5	L5	100	97 (93)
6 <sup>c</sup>	L5	15	9



R = R' = H, L3  
 R = H, R' = Me, L4  
 R = R' = Me, L5

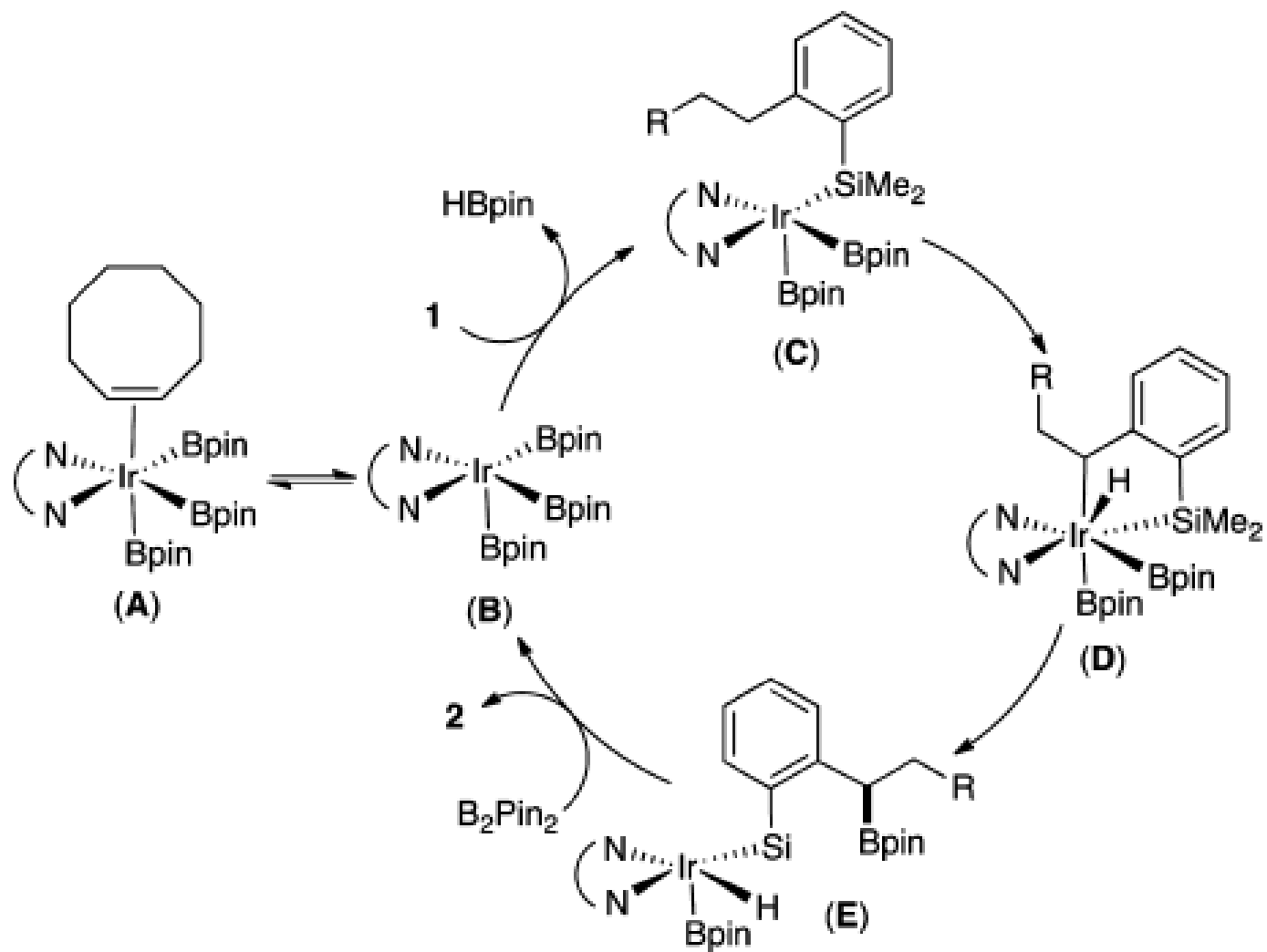
[dx.doi.org/10.1021/ja403462b](https://doi.org/10.1021/ja403462b) | *J. Am. Chem. Soc.*

# Substrate Scope



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# Proposed Mechanism



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The background features several large, stylized, overlapping swirls in shades of purple, green, and light blue. Scattered throughout the scene are numerous small, yellow, triangular shapes, some pointing upwards and others downwards, creating a festive or celebratory atmosphere.

Thank you for your listening