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## New Borylated Heterocycles: Indoles, Isoxazoles, Lactones, and Benzofurans, and the Methods to Make Them (related to UC Case 2016-029)

Tech ID: 24370 / UC Case 2013-921-0

### BACKGROUND

Boron building blocks play a key role in modern organic chemistry, especially in drug design and materials synthesis. Methods to generate heterocycles and borylated compounds in the same synthetic step are largely unknown; the ability to do both increases efficiency and rapidly builds molecular complexity while providing access to previously unavailable building blocks.

### TECHNOLOGY DESCRIPTION

The researchers at the University of California, Irvine ("UCI"), have discovered novel borylation-heterocyclization reactions that take place under mild conditions to provide functionalized heterocyclic building blocks not currently on the market. This technology encompasses both the materials themselves as well as the method to make them. Borylated heterocycles include indoles, isoxazoles, benzofurans, benzopyrroles, pyrroles, furans, and thiophenes—core structures of interest in drug discovery and materials synthesis. These borylation methods, oxyboration and aminoboration, can be used to access a wide array of borylated heterocycles from simple starting materials. The reactions are efficient, more functional group tolerant than major competing methods, and in some cases avoid the toxic heavy metals that are required in competing technology. Thus, complex organic molecules including potential therapeutics can be rapidly and efficiently assembled using this technology, improving throughput.

### APPLICATION

New organoboron compounds for constructing heterocycles in organic synthesis, especially in drug discovery and materials synthesis. A convenient and versatile method for making heterocyclic organoboron compounds.

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	16/108,562	10/29/2019	2013-921
United States Of America	Issued Patent	10,183,957	01/22/2019	2013-921
United States Of America	Issued Patent	9,512,147	12/06/2016	2013-921
United States Of America	Issued Patent	9,238,661	01/19/2016	2013-921

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### OTHER INFORMATION

#### KEYWORDS

Organoboron, Alkoxyboration, Oxyboration, Aminoboration, Benzimidazole, Pyrazole, Suzuki partner, Heterocycle, Cross-coupling, Borylated indole, pyrrole, furan, thiophene, benzothiophene, benzofuran, benzimidazole, pyrazole, isoxazole, etc..., Building block

#### CATEGORIZED AS

- » **Materials & Chemicals**
  - » Chemicals
- » **Research Tools**
  - » Reagents

RELATED CASES

2013-921-0, 2016-029-0

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