

**Title:** Synthesis of medicinally relevant core utilizing samarium diiodide catalyzed reactions

**Abstract:** The classical single electron transfer reductant, samarium(II) diiodide, remains one of the most important reducing agents and mediators of radical chemistry after four decades of widespread use in synthesis. While the chemistry of SmI<sub>2</sub> is very often unique, and thus the reagent is indispensable, it is almost invariably used in superstoichiometric amounts, thus raising issues of cost and waste.<sup>1</sup> In my postdoctoral research career, I have worked on developing highly desirable SmI<sub>2</sub>-catalyzed intermolecular radical coupling reactions. We have developed an efficient method for the construction of decorated cyclopentenes using an intermolecular radical coupling of aryl cyclopropyl ketones and alkynes.<sup>2,3</sup>

Bicyclo[2.1.1]hexanes (BCHs) are new emerging hydrocarbon bioisosteres for *ortho*- and *meta*-substituted benzenes. Unfortunately, the substituted BCH scaffold remains difficult to access and a general catalytic approach is urgently needed. We have described a catalytic approach that delivers substituted BCHs *via* a highly atom-economical intermolecular coupling. The product BCH ketones have been shown to be versatile synthetic intermediates through selective downstream manipulation and the expedient synthesis of a saturated hydrocarbon analogue of the broad-spectrum antimicrobial, phthalylsulfathiazole. These findings have provided the first general catalytic approach to the substituted BCH scaffold and will allow the potential of the largely unexplored family of bioisosteres to be realized.<sup>4</sup>

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(1) *Chem. Soc. Rev.* **2021**, 50, 5349-5365. (2) *J. Am. Chem. Soc.* **2021**, 143, 3655-3661.  
(3) *Trends in Chemistry* **2021**, 3, 982-983. (4) *Nat. Chem.* **2023**, 15, 535-541.