

# International Summit on Past and Present Research Systems of Green Chemistry

August 25-27, 2014 Hilton Philadelphia Airport, USA

## Polymer-supported siloxane transfer agents: A green chemistry approach toward cross-coupling reactions

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Palladium-catalyzed cross-coupling reactions (CCR) of organometallic reagents with electrophiles are among the most important transformations in organic synthesis for the construction of natural products, pharmaceutical agents, and diverse functional materials, as noted by the 2010 Nobel Prize in Chemistry to Heck, Negishi, and Suzuki. As one of the earliest organometallic reagents to be cross-coupled, organolithiums are among the most reactive and commonly used reagents in organic synthesis. They are cheap and either commercially available or readily accessible through metal-halogen exchange or via direct metallation. However, the direct use of organolithium reagents in CCR has remained a challenge, often hampered by low yields, limited substrate scope due to the very high reactivity, and/or yielding homo-coupled products. To overcome these issues, organolithium reagents are frequently converted to other less reactive organometallic reagents (e.g., organoborons, organozincs, organotin) to be employed in CCR. Thus, a concise method taking advantage of the direct use of organolithiums in CCR would eliminate the need for stoichiometric amount of toxic heavy metals (e.g., tin and zinc), as well as to avoid the extra manipulation and purification steps required to generate other organometallic reagents. Since 2012, the Smith group has reported a series of silicon reagents, termed siloxane transfer agents, which permit the direct use of organolithiums in CCR. Specifically, we have very recently successfully achieved the incorporation of the silicon coupling agents onto carefully designed polymer supports that significantly simplify both product purification and siloxane recycle. Pleasingly, the polymer-supported siloxane transfer agents are highly effective in CCR, proceeding in high yield with excellent recyclability, rendering this tactic a powerful new tool in organic synthesis that could provide “greener” and more sustainable chemical processes.

### Biography

Minh H Nguyen received his BS in Chemistry and Biochemistry & Molecular Biology from Dickinson College, USA in 2005. He then served as adjunct faculty in Chemistry at Dickinson College for a short period of time before embarking on a PhD program in Organic Chemistry at the University of Pennsylvania. He is now a 4th year graduate student in the laboratory of Professor Amos B Smith, III. His research in the Smith group focuses on the design, synthesis, and development of organosilicon reagents and polymer-supported silicon reagents for transition-metal catalyzed carbon-carbon and carbon-heteroatom bonds formation as well as the total synthesis of natural products as potential anti-cancer agents.

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