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Transition metal catalysis for non-directed C-H functionalization

Marion Heidi Emmert
Worcester Polytechnic Institute, USA

Catalysis is one of the most powerful tools of green chemistry, enabling reactions with lower energy consumption and providing new pathways for bond formation. Catalytic C-H functionalizations, in particular, are powerful methodologies for installing functional groups in previously non-functionalized positions of a molecule and the use of catalyst directing groups has enabled a wide variety of exciting bond formations with remarkable selectivities and broad applicability. One of the greatest current challenges in this research area is how to catalyze analogous C-H functionalization reactivity without the presence of catalyst directing groups. Such transformations often suffer from the lack of a strong catalyst pre-coordination, which can lead to lower reactivities. The research described in this presentation will showcase basic principles of catalyst and methodology design to achieve non-directed C-H functionalizations and provide insights into reactivity and selectivity-determining factors for the C-H aminations of arenes and the alpha-C H oxidation of tertiary amines.

Biography

Marion Heidi Emmert received her PhD from the University of Munster (Germany) working with Professor Gerhard Erker on model polymerization catalysts. Following Postdoctoral work at the University of Michigan with Professor Melanie Sanford, she joined the faculty at WPI in 2011 as Assistant Professor of Chemistry, with joint appointments in Materials and Chemical Engineering since 2012. Her research interest focuses on the development of new, sustainable processes; current projects include C-H functionalizations, aerobic oxidations at low oxygen concentrations, and recycling processes for rare earth materials.

mhemmert@WPI.EDU

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