PN^3(P)Pincer Complexes: Cooperative Catalysis and Beyond

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About Professor Huang Kuo-Wei
Prof Huang is currently a Professor of Chemical Sciences at King Abdullah University of Science and Technology (KAUST). He received his B.Sc. from National University of Taiwan in 1997 and Ph.D. from Stanford University in 2004. Prior to joining KAUST in 2009 as a founding faculty member, he was an Assistant Professor of Chemistry in National University of Singapore. The research interests of his group include CO2 utilization, hydrogen storage, small molecules activation and kinetic and DFT studies of transition metal and organocatalysis. He is a co-author of over 180 peer-reviewed international publications and a co-inventor of 13 patents and patent applications. He also serves as an Associate Editor of Journal of Saudi Chemical Society (JSCS) and a consultant and trainer for the Saudi Team for International Chemistry Olympiad (STIChO). He has received numerous awards, namely Rising Stars Lectureship, 41st International Conference on Coordination Chemistry (2014), SABIC Chair Professorship (2013-2016), Asian Rising Stars Lectureship, the 15th Asian Chemical Congress (2013), IKEN Visiting Fellowship (2012); Asian Core Program Lectureship (2012), and many more.

Abstract
Pincer transition metal complexes have versatile reactivities to catalyze many organic transformations and to activate strong chemical bonds. In particular, complexes with ligand derived from tridentate pyridine-based framework exhibit interesting reactivities. We have developed a novel platform of pincer-type PN^3(P)-ligands which are capable of interacting with the substrates during the reaction. Rich reactivities have been observed with their catalytic activities being explored. In very recent work, we have witnessed that the seemingly small change by replacing the CH_2 spacer in the pyridine-based pincer complex with an NH group has dramatically influenced the thermodynamic and kinetic properties, and in some cases the catalytic behaviors of the corresponding metal complexes. It is conceivable that this new class of transition metal pincer complexes will offer exciting opportunities for the development of novel catalytic applications in the petrochemical and energy sectors.