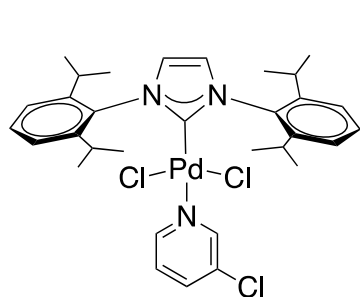


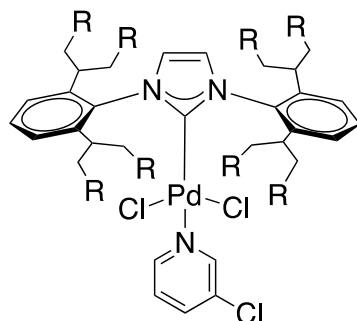
# Designing Purpose-Built Ligands for Catalysts: “Say Live and Let Die....”

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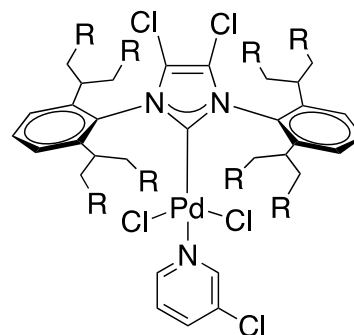
This seminar will address the invention and evolution of the Pd-PEPPSI catalyst platform (PEPPSI = pyridine enhanced pre-catalyst preparation stabilization and initiation).



***Pd-PEPPSI-IPr***  
**(First Generation)**



***Pd-PEPPSI-IPent (R = Me)***  
***Pd-PEPPSI-IHept (R = Et)***  
**(Second Generation)**



***Pd-PEPPSI-IPent<sup>Cl</sup> (R = Me)***  
***Pd-PEPPSI-IHept<sup>Cl</sup> (R = Et)***  
**(Third Generation)**

Considerable effort for almost half a century has been devoted to understanding how ligand steric and electronic properties modulate the reactivity of a metal centre in a large number of catalytic processes. This is confounded by the fact that many of these transformations have two or more steps in their catalytic cycles, which may mean that a favourable attribute in one step may act to disfavour another step. Many groups have worked diligently to develop methods to probe, and scales to grade ligand properties such that they can be used in, ideally, a predictive fashion to guide the development of new catalysts.

In this presentation our approach to rational ligand design in cross-coupling applications will be discussed and how this approach has been used to improve catalyst performance in terms of both general reactivity and selectivity. In particular, time will be dedicated to the discussion of 1) avoiding beta hydride elimination in the coupling of alkyl nucleophiles and electrophiles leading to metal hydride formation and olefin byproducts, 2) the incorporation of secondary alkyl centres onto aromatic and heteroaromatic cores without isomerization to create more architecturally complex molecular targets, and 3) the impact of these innovations in drug discovery and materials science.