Explorations in main group mediated catalysis: phosphine dehydrocoupling and the search for silane activation

The use of main group elements as reaction centers for catalysis has increasingly garnered interest. The ability of main group metals to access multiple oxidation states mirrors that of some transition metals while their role or potential in catalysis has not been fully understood. Key to the application of main group metals for catalysis is determining the mechanism through which transformations can occur. In collaboration with Prof. Dominic Wright, Cambridge University, the mechanism by which phosphines are dehydrocoupled using $Cp^*_2SnCl_2$ (Cp* = pentamethylcyclopentadienyl) has been studied. Possible intermediates have been identified and the application of a tentative mechanism of phosphine dehydrocoupling towards silane activation will be presented using other main group molecules.