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### **Catalytic Dehydrocoupling of Phosphines Towards the Preparation and Characterization of $\pi$ -conjugated Materials**

Polymers that possess  $\pi$ -conjugated backbones have been used in electronic devices and various ceramics due to their unique thermal and electronic properties. Tuning the properties of these materials is often accomplished by varying heteroatoms in the monomeric species. Incorporating phosphorus into the backbone of these materials is advantageous because the lone pair on phosphorus has been shown to participate in conjugation with aromatic species. Recently, a zirconium triamidoamine catalyst, Zr [ $\kappa_5$ -(Me<sub>3</sub>SiNCH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>NSiMe<sub>2</sub>CH<sub>2</sub>]<sub>2</sub>Zr (**1**) has been shown to be effective in catalyzing the formation of phosphorus bonds via dehydrocoupling. Various substrates including 2,5-bisphosphinofuran and p-phosphinobenzene were dehydrocoupled via **1** to yield insoluble polymeric materials. Efforts to characterize these products have been limited due to poor solubility. Rational substrate design incorporating aliphatic side chains to circumvent the solubility issues has been accomplished. Current efforts to prepare, dehydrocouple, and characterize these polymeric materials are ongoing.