

## Iron-Catalyzed Oxidative C–H Alkenylation of Thiophene Compounds

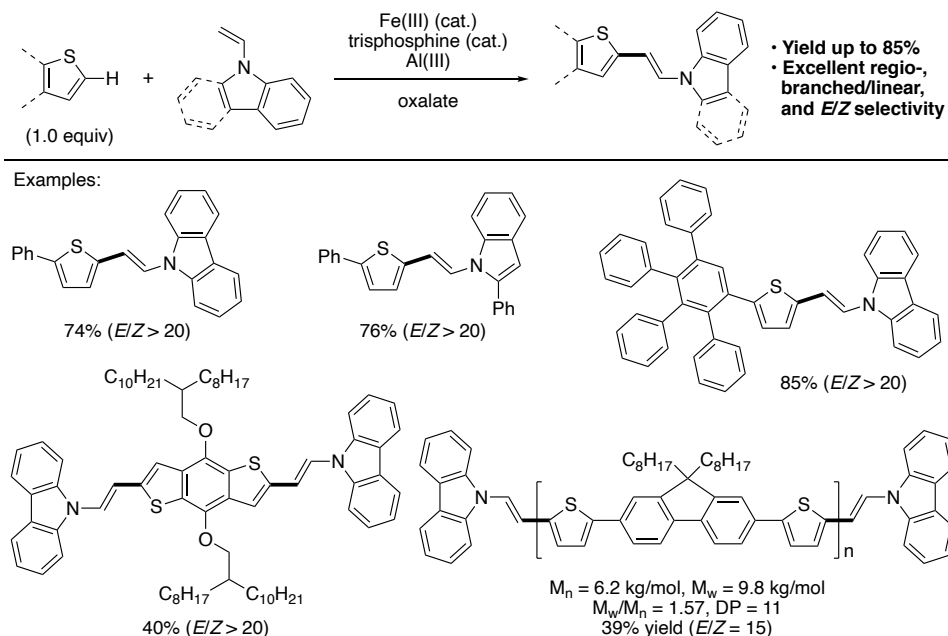
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Transition-metal-catalyzed oxidative C–H alkenylation (Fujiwara-Moritani type reaction) has attracted much attention as one of the most straightforward methods to synthesize alkenyl compounds. However, the scope of alkenes has long been limited to electron-deficient alkenes such as acrylates and styrenes,<sup>1</sup> and there are only a limited number of reports with electron-rich alkenes.<sup>2</sup>

Herein, we report that electron-rich vinylcarbazoles and vinylindoles react with thiophene compounds using Fe(III) as a catalyst, trisphosphine as a ligand, Al(III) as a base, and oxalate<sup>3</sup> as a mild oxidant. This reaction gives direct access to donor materials containing unique enaminyll thiophene structures<sup>4</sup> with controlled regio-, branched/linear, and *E/Z* selectivity. Moreover, this method is applicable to the synthesis of a vinylcarbazole-endcapped thiophene polymer. Deuterium exchange between two substrates indicated that enamines react through an electrophilic metalation mechanism rather than a carbometallation mechanism.



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