

# 화학과 세미나

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## Iron-Catalysis and their Applications in the Synthesis of $\pi$ -Functional Materials

As the most abundant metal on the Earth with negligible biological toxicity, iron is ideal as a sustainable catalytic resource for producing organic functional materials. Through years of research on iron catalysis and conjugated materials, we have come to understand various unique properties of organic iron compounds, especially their low oxidation-reduction potentials in catalyst turnover and the mechanism of C-H bond cleavage. The speaker acknowledges that these characteristics give iron catalysis an advantage in synthesizing highly conjugated molecules, especially those with higher HOMO energy levels that are difficult to obtain. We have successfully designed several iron-catalyzed transformations to obtain conjugated molecules, including C-H/C-H coupling for polymerization, tandem cyclization to highly strained frameworks, efficient aza- $\pi$  extension, and spiro cyclizations. These new methodologies facilitate the efficient synthesis of various conjugated polymers and small polycyclic conjugated molecules. Some new molecules created through our iron catalysis have exhibited excellent performance in solar cells, organic photodetectors, and promising applications for light-emitting diodes, demonstrating their potential for the organic electronics industry.

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