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Geminal cross-coupling polymerization for multiple topological conjugated polymers

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The cross-coupling reactions have been used in general C-C bond formation to develop new π-conjugated molecular topological configurations, which is an essential objective for material chemists and can be used extensively in optoelectronic devices such as chemical biosensing, organic light emitting diode (OLED) and organic photovoltaics. Here, we report the general twofold germinal cross-coupling (GCC) for C-C bond formation at 1,1-dibromoolefin over heterogeneous Pd catalysts for multiple π-conjugated molecular topological configurations. We employ a series of recipes from a library of precursors to produce π-conjugated macrocyclics, conjugated dendrimers, linear conjugated polymers, mesoporous conjugated polymer nanoparticles and 2-3 dimensional conjugated covalent organic frameworks (COF). This universal strategy toward specific π-conjugated molecular topological configurations enables efficient coupling of aryl bromides with various coupling partners with high activity and selectivity under mild conditions. The π-conjugated macrocyclics, dendrimers and 1-D polymers show featured molecular assembly and fluorescence properties. 2D and 3D covalent organic frameworks show excellent N2-adsorption and catalytic activity and recyclability in heterogeneous Suzuki-Miyaura cross-coupling reaction.

Biography

Ming-Qiang Zhu has his expertise in Optoelectronic Polymer Chemistry, Super-Resolution Fluorescent Imaging, Fluorescent Sensors as well as their application in Biomedical Engineering. He is a Professor of Chemistry and Optoelectronics in Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, Wuhan, China.

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