

Abstract;

The transition metal-catalyzed C(sp³)-H and C(sp²)-H functionalization is emerging as one of the important synthetic transformations for the construction of C–C and C–X bonds (X = C, N, O, P, etc.). This thesis work aimed to synthesize functionalized aliphatic chains containing stereogenic centers through the Pd-catalyzed directing group-aided diastereoselective C(sp³)-H functionalization/arylation strategy. Accordingly, the bidentate directing group 8-aminoquinoline-aided Pd(II)-catalyzed diastereoselective β-arylation of the prochiral secondary sp³ C-H bonds of 2-phenylbutanamides and related aliphatic carboxamides was reported. Next, the diastereoselective sp³ C–H arylation followed by ring opening of cyclopropanecarboxamides was reported. Further, bis-arylation of methyl sp³ C-H bonds of racemic and optically pure 2-arylpropionamides and desymmetrization of symmetrical dicarboxylic acid systems via arylation of methylene sp³ C-H bonds were reported.