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(54) Title: Pd(II)-CATALYZED ENANTIOSELECTIVE BETA-METHYLENE C(sp³)-H BOND ACTIVATION

(57) Abstract: Chiral acetyl-protected aminoethyl quinoline (APAQ), pyridine and imazoline ligands are disclosed that enable Pd (II)-catalyzed enantioselective arylation or heteroarylation of ubiquitous prochiral β -methylene C-H bonds of aliphatic amides offers an alternative disconnection for constructing β -chiral centers. Systematic tuning of the ligand structure reveals that a six-membered instead of a five-membered chelation of these types of ligands with the Pd(II) is important for accelerating the C(sp³)-H activation thereby achieving enantioselectivity for quinoline and pyridine ligands.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/023229**A. CLASSIFICATION OF SUBJECT MATTER**

C07D 215/04(2006.01)i, C07D 401/06(2006.01)i, C07D 491/048(2006.01)i, C07D 491/052(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
C07D 215/04; C07D 401/06; C07D 491/048; C07D 491/052Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal), STN (Registry, Caplus), Google & Keywords:enantioselective arylation, beta-carbon, Pd-catalyzed, chiral insertion, quinoline, pyridine, oxazol**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Chemical Abstract Compound, STN express. RN No.42182-56-9 (16 November 1984) RN No.75427-26-8 (16 November 1984), RN No.816417-46-6 (19 January 2005), RN No.856856-19-4 (25 July 2005), RN No.1339906-78-3 (02 November 2011), RN No.859064-84-9 (09 August 2005), RN No.27854-91-7 (16 November 1984), RN No.197503-31-4 (19 November 1997) See the compounds.	1, 2
A		3-36
X	Chemical Abstract Compound, STN express. RN No.1698515-90-0 (05 May 2015), RN No.1566612-03-0 (11 March 2014), RN No.1872217-77-0 (22 February 2016), RN No.1872217-76-9 (22 February 2016) See the compounds.	1, 5-7, 19, 21, 22, 25
A		2-4, 8-18, 20, 23, 24 , 26-36
A	HE, J. et al., "Ligand-controlled C(sp ³)-H arylation and olefination in synthesis of unnatural chiral α -amino acids", Science, 2014, Vol. 343, Issue 6176, pages 1216-1220 See page 1217; and figure 2.	1-36

 Further documents are listed in the continuation of Box C. See patent family annex.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ZHANG, X. et al., "Palladium-catalyzed β -C(sp ³)-H arylation of phthaloyl alanine with hindered aryl iodides: synthesis of complex β -aryl α -amino acids", Organic & Biomolecular Chemistry, [first published] 12 January 2016, Vol. 14, pages 5511-5515 See pages 5511-5514.	1-36
A	ENGLE, K. M. et al., "Developing ligands for palladium(II)-catalyzed C-H functionalization: Intimate dialogue between ligand and substrate", Journal of Organic Chemistry, 2013, Vol. 78, Issue 18, pages 8927-8955 See scheme 21.	1-36
A	GAO, X. et al., "Enantioselective palladium-catalyzed C-H functionalization of indoles using an axially chiral 2,2'-bipyridine ligand", Angewandte Chemie International Edition, 2015, Vol. 54, pages 11956-11960 See page 11958.	1-36
PX	XU, Z.-Y. et al., "Superior ligand for Pd(II)-catalyzed enantioselective arylation of C(sp ³)-H bonds: chiral acetyl protected aminoethyl quinoline", Science China Chemistry, [published online] 26 December 2016, Vol. 60, Issue 2, pages 165-166 See pages 165-166; and figure 1.	1-4,8-18,26-29 ,33-36
PX	CHEN, G. et al., "Ligand-accelerated enantioselective methylene C(sp ³)-H bond activation", Science, 02 September 2016, Vol. 353, Issue 6303, pages 1023-1027 See pages 1024-1026	1-4,8-18,26-29 ,33-36

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Information on patent family members

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Publication
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None