reaction conditions, thereby forming the ligand; wherein: (a) when the first reactant is 2-((tetrahydro-2H-pyran-2-yl)oxy)-[1,1'-biphenyl]-3-yl lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2-(3-((2'-hydroxy-[1,1':3',1"-terphenyl]-2-yl)methoxy)propoxy)-5-methyl-[1,1':3',1"-terphenyl]-2'-ol (Ligand AP); or wherein (b) when the first reactant is 2',5,5'-trimethyl-2-((methoxymethoxy)-[1,1'-biphenyl]-3-yl lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2-(3-((2'-hydroxy-2",5',5"-trimethyl-[1,1':3',1"-terphenyl]-2-yl)methoxy)propoxy)-2",5,5',5"-tetramethyl-[1,1':3',1"-terphenyl]-2'-ol (Ligand BP); or wherein (c) when the first reactant is 2-(methoxymethoxy)-5-methyl-3-(2-methylnaphthalen-1-yl)phenyl) lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2'-(3-((2'-hydroxy-5'-methyl-3'-(2-methylnaphthalen-1-yl)-[1,1'-biphenyl]-2-yl)methoxy)propoxy)-5,5'-dimethyl-3-(2-methylnaphthalen-1-yl)-[1,1'-biphenyl]-2-ol (Ligand CP). The disclosure also includes a process for preparing analogous Ligands AE, BE, and CE.

In one aspect, the present disclosure refers to a process for preparing a ligand, the process comprising contacting 3-((2-bromobenzyl)oxy)propan-1-ol with bromocresol and triphenylphosphine in a reaction medium under reaction conditions, thereby forming a 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene; and contacting a first reactant with a bridging reactant in a polar aprotic reaction medium under reaction conditions, thereby forming the ligand; wherein: (a) when the first reactant is 2-((tetrahydro-2H-pyran-2-yl)oxy)-[1,1'-biphenyl]-3-yl lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2-(3-((2'-hydroxy-[1,1':3',1"-terphenyl]-2-yl)methoxy)propoxy)-5-methyl-[1,1':3',1"-terphenyl]-2'-ol (Ligand AP); or wherein (b) when the first reactant is 2',5,5'-trimethyl-2-((methoxymethoxy)-[1,1'-biphenyl]-3-yl lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2-(3-((2'-hydroxy-2",5',5"-trimethyl-[1,1':3',1"-terphenyl]-2-yl)methoxy)propoxy)-2",5,5',5"-tetramethyl-[1,1':3',1"-terphenyl]-2'-ol (Ligand BP); or wherein (c) when the first reactant is 2-(methoxymethoxy)-5-methyl-3-(2-methylnaphthalen-1-yl)phenyl) lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2'-(3-((2'-hydroxy-5'-methyl-3'-(2-methylnaphthalen-1-yl)-[1,1'-biphenyl]-2-

WHAT IS CLAIMED IS:

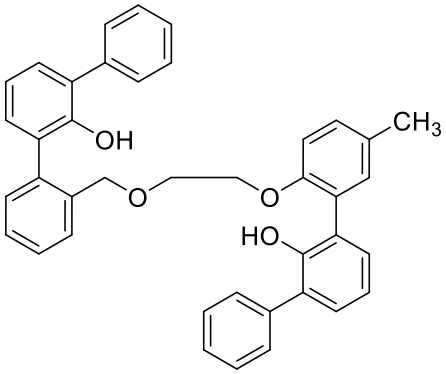
1. A process for preparing a ligand, the process comprising

contacting 3-((2-bromobenzyl)oxy)propan-1-ol with bromocresol and triphenylphosphine in a reaction medium under reaction conditions, thereby forming a 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene; and

contacting a first reactant with a bridging reactant in a polar aprotic reaction medium under reaction conditions, thereby forming the ligand; wherein: (a) when the first reactant is 2-((tetrahydro-2H-pyran-2-yl)oxy)-[1,1'-biphenyl]-3-yl lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2-(3-((2'-hydroxy-[1,1':3',1"-terphenyl]-2-yl)methoxy)propoxy)-5-methyl-[1,1':3',1"-terphenyl]-2'-ol (Ligand AP); or wherein (b) when the first reactant is 2',5,5'-trimethyl-2-((methoxymethoxy)-[1,1'-biphenyl]-3-yl lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2-(3-((2'-hydroxy-2",5',5"-trimethyl-[1,1':3',1"-terphenyl]-2-yl)methoxy)propoxy)-2",5,5',5"-tetramethyl-[1,1':3',1"-terphenyl]-2'-ol (Ligand BP); or wherein (c) when the first reactant is 2-(methoxymethoxy)-5-methyl-3-(2-methylnaphthalen-1-yl)phenyl) lithium, the bridging reactant is 2-bromo-1-(3-((2-bromobenzyl)oxy)propoxy)-4-methylbenzene, and the ligand is 2'-(3-((2'-hydroxy-5'-methyl-3'-(2-methylnaphthalen-1-yl)-[1,1'-biphenyl]-2-yl)methoxy)propoxy)-5,5'-dimethyl-3-(2-methylnaphthalen-1-yl)-[1,1'-biphenyl]-2-ol (Ligand CP).

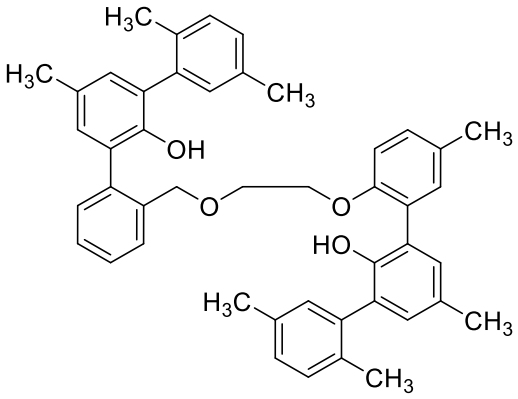
2. The process of claim 1 further comprising a preliminary step to prepare the 3-((2-bromobenzyl)oxy)propan-1-ol, the preliminary step comprising contacting 1,3-propanediol with 2-bromobenzylbromide in a reaction medium under reaction conditions, thereby forming the 3-((2-bromobenzyl)oxy)propan-1-ol.

3. The process of claim 1 wherein the bridging reactant is a 2-bromo-1-(2-((2-bromobenzyl)oxy)ethoxy)-4-methylbenzene, and the ligand is Ligand AE



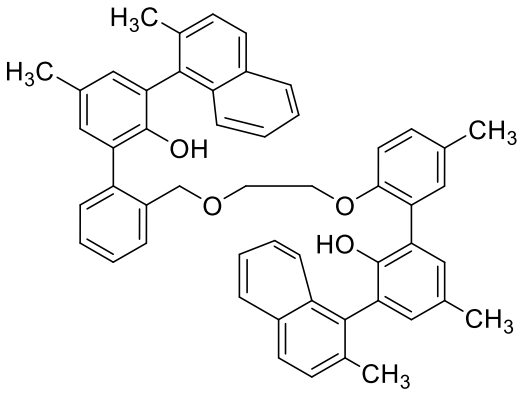
(Ligand AE),

Ligand BE



(Ligand BE),

or Ligand CE



(Ligand CE), respectively.

4. The process of any of claims 1 or 3 further comprising contacting the ligand with bis-benzyl-zirconium(IV) dichloride ($ZrBn_2Cl_2$) in a reaction medium under reaction conditions, thereby forming the zirconium complex of the ligand.

5. The process of claim 3 wherein the 2-bromo-1-(2-((2-bromobenzyl)oxy)ethoxy)-4-methylbenzene is prepared by a process comprising contacting 2-((2-bromobenzyl)oxy)ethanol with bromocresol in a reaction medium under reaction conditions, thereby forming the 2-bromo-1-(2-((2-bromobenzyl)oxy)ethoxy)-4-methylbenzene.

6. The process of claim 5 wherein the 2-((2-bromobenzyl)oxy)ethanol is prepared by a process comprising contacting ethylene glycol with 2-bromobenzylbromide in a reaction medium under reaction conditions, thereby forming the 2-((2-bromobenzyl)oxy)ethanol.