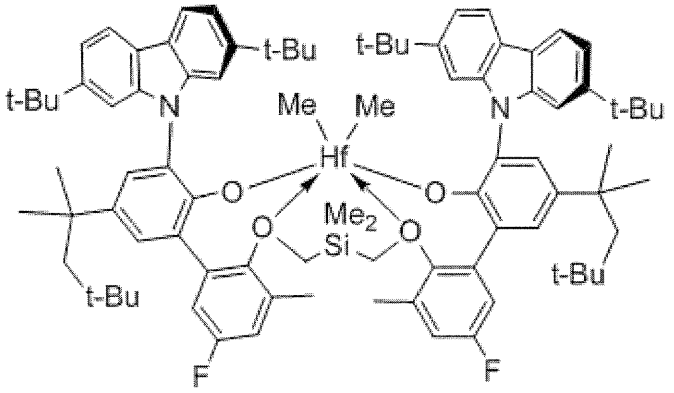
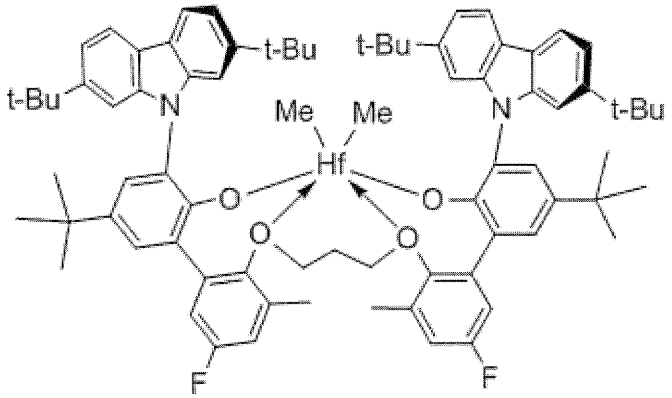
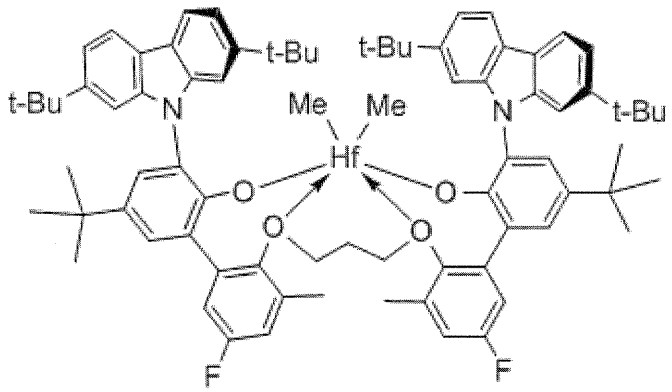
We Claim:

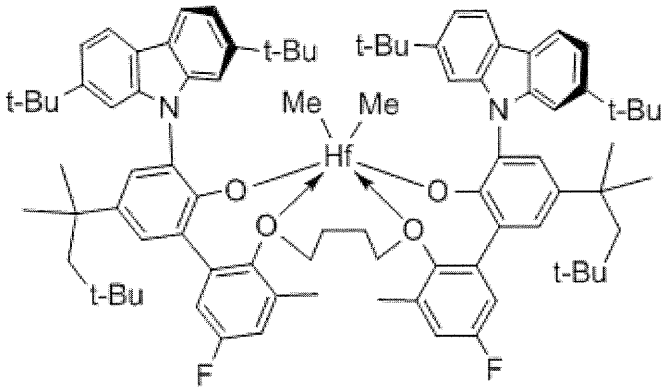
1. A polymerization process for producing ethylene based polymers comprising: polymerizing ethylene and optionally one or more α-olefins in the presence of one or more first catalyst systems and optionally one or more second catalyst systems in a dual reactor system or a multiple reactor system, wherein first catalyst system comprises;

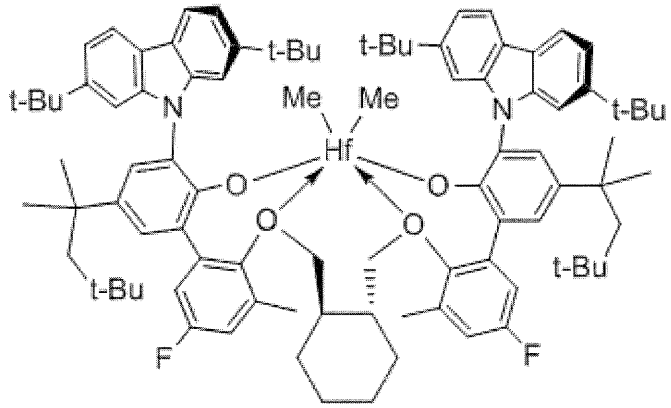
(a) one or more procatalysts comprising a metal-ligand complex selected from the group consisting of

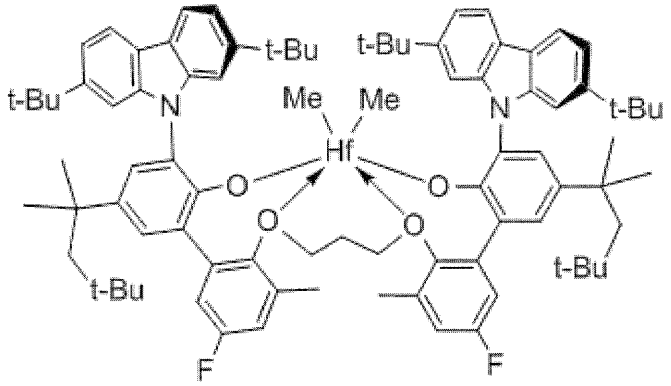




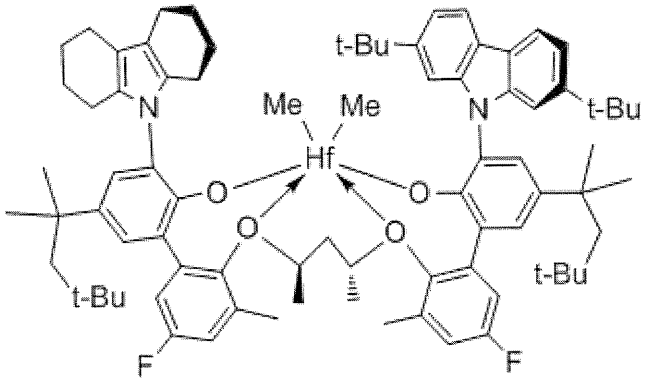


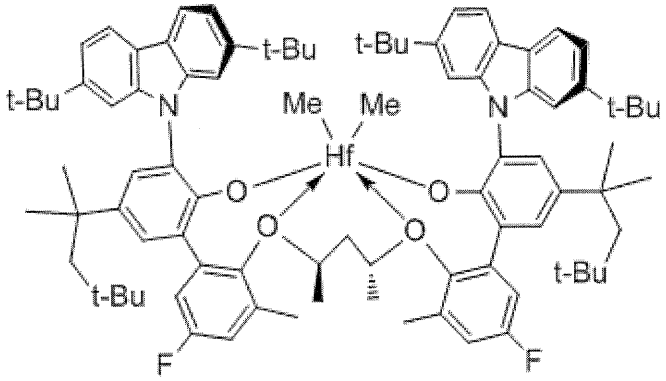

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

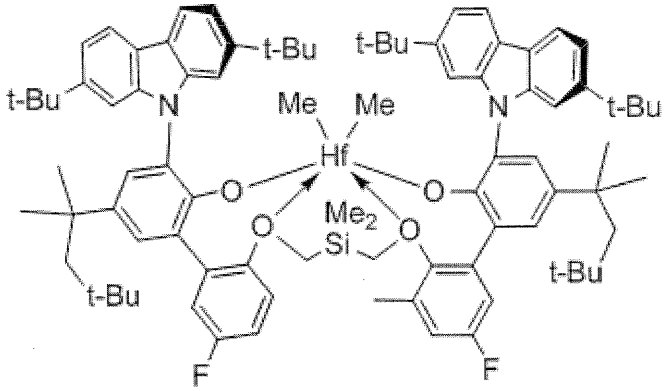

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

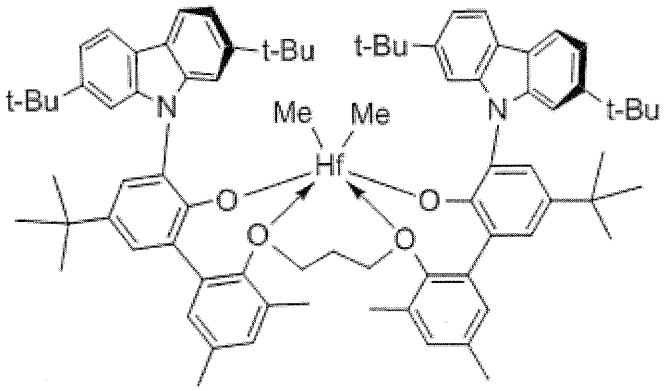

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

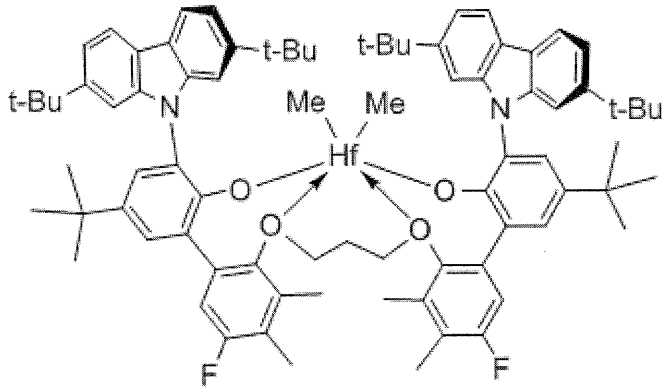
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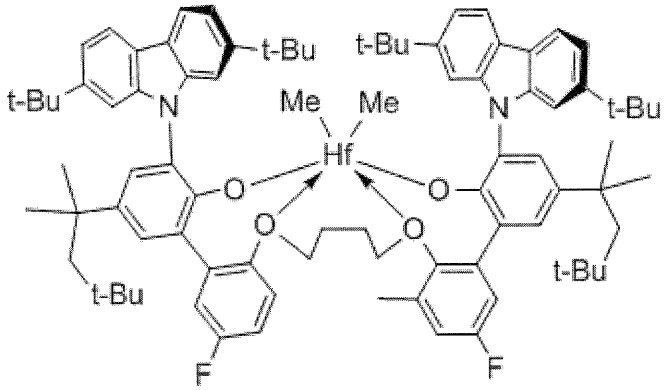

t-Bu
t-Bu
N
Me
Me
N
t-Bu
Hf
O
O
O
O
t-Bu
t-Bu
F
F

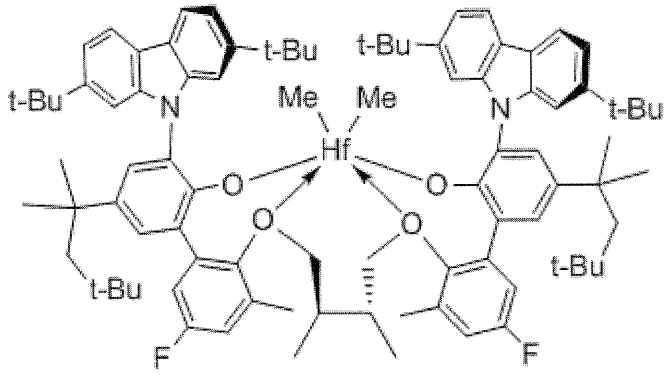

t-Bu
t-Bu
t-Bu
t-Bu
N
Me
Me
N
t-Bu
Hf
O
O
O
O
t-Bu
t-Bu
F
F

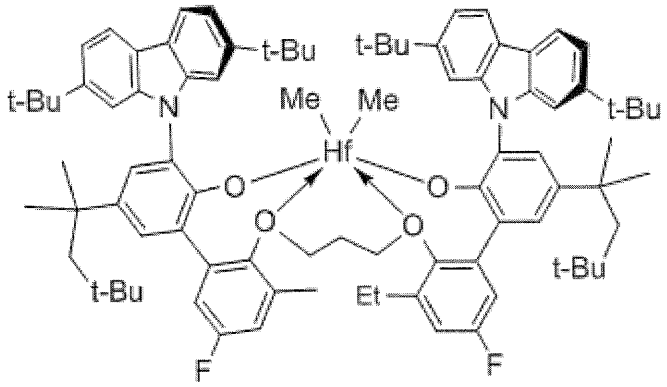

t-Bu
t-Bu
t-Bu
t-Bu
N
Me
Me
N
t-Bu
Hf
O
O
Me2
Si
O
O
t-Bu
t-Bu
F
F

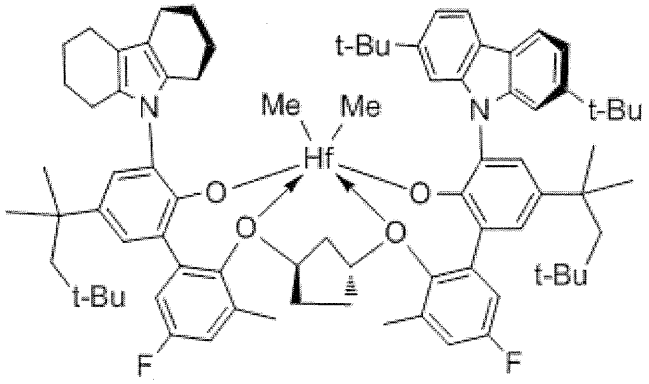

t-Bu
t-Bu
t-Bu
t-Bu
N
Me
Me
N
t-Bu
Hf
O
O
O
O

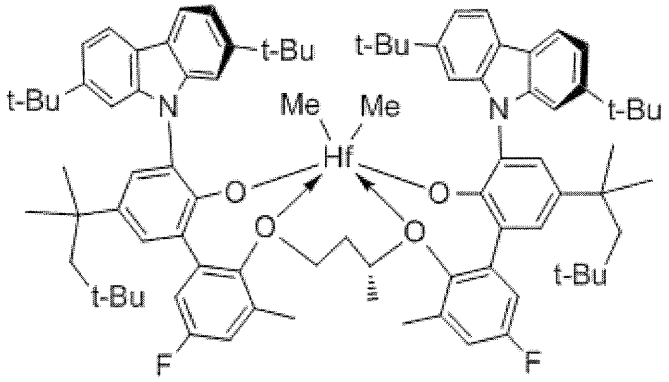

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
F
F

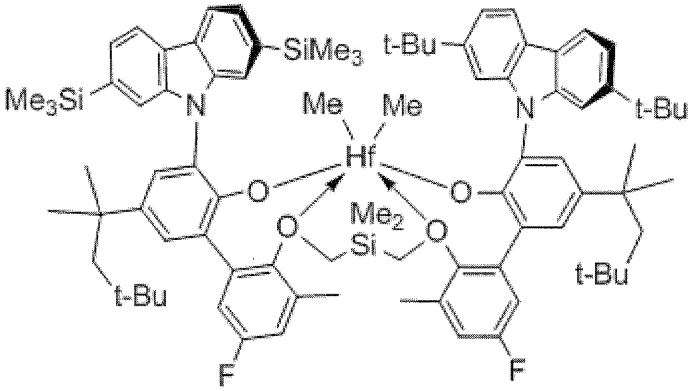

t-Bu
t-Bu
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t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

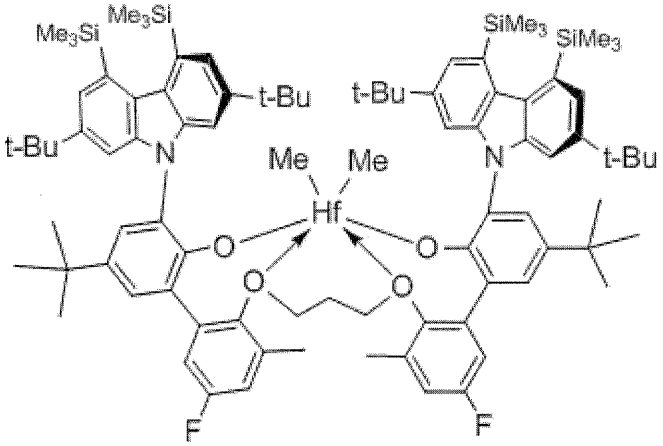

t-Bu
t-Bu
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t-Bu
N
N
Me
Me
Hf
O
O
O
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t-Bu
F
F

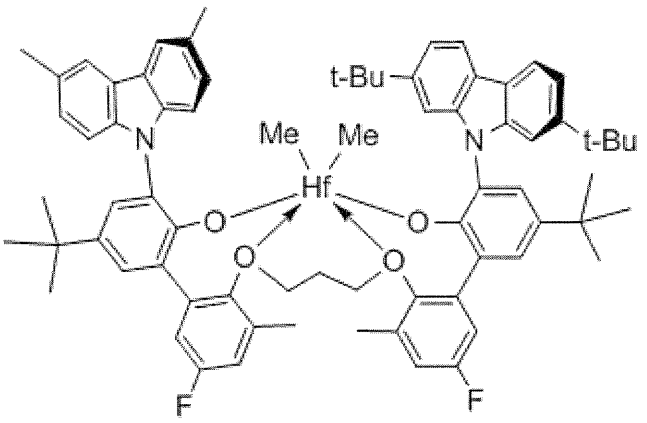

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
Et
F
F

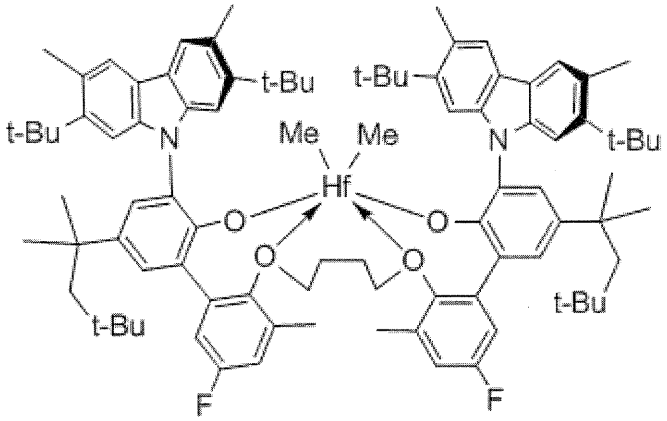

t-Bu
Me
Me
Hf
N
t-Bu
O
O
O
O
t-Bu
t-Bu
F
F

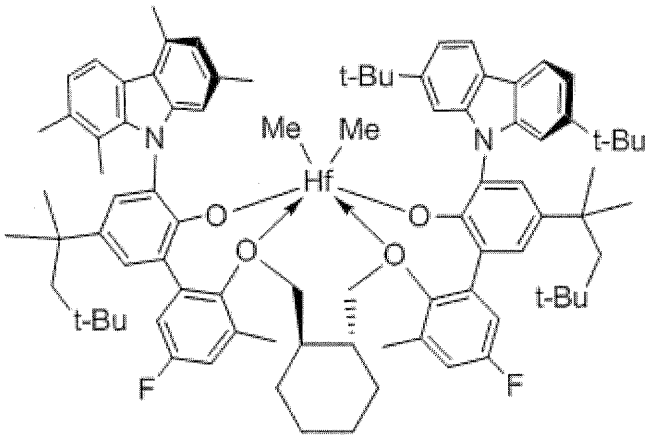

t-Bu
t-Bu
t-Bu
Me
Me
Hf
N
t-Bu
O
O
O
O
t-Bu
t-Bu
F
F

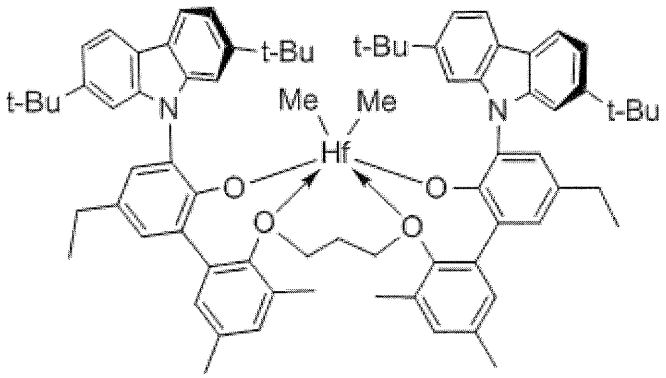

SiMe3
t-Bu
Me3Si
N
Me
Me
N
t-Bu
Hf
O
O
Me2
Si
O
O
t-Bu
t-Bu
F
F

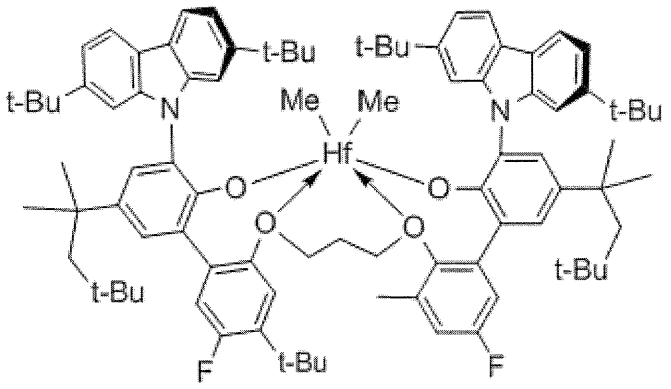

Me3Si
Me3Si
SiMe3
SiMe3
t-Bu
t-Bu
t-Bu
N
Me
Me
N
t-Bu
Hf
O
O
O
O
F
F

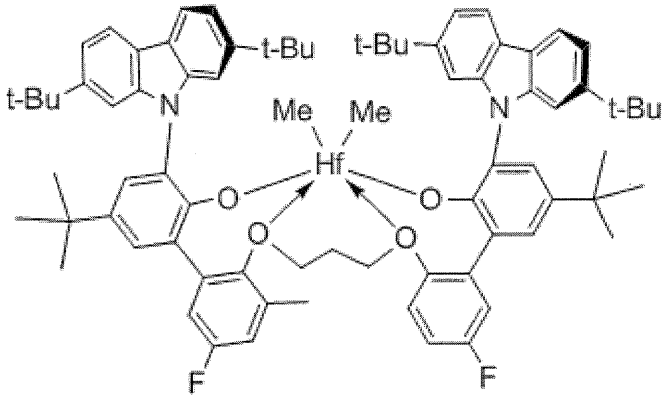

t-Bu
Me
Me
Hf
N
O
F

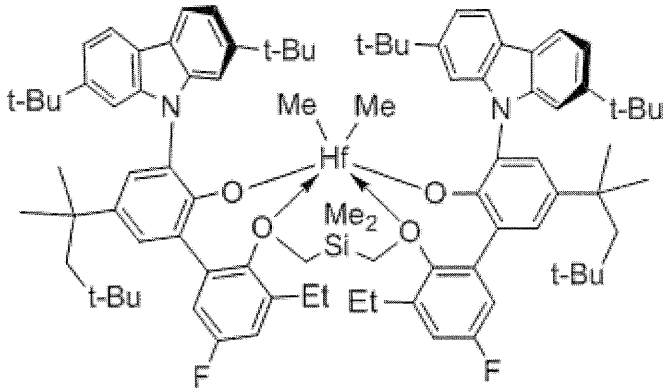

t-Bu
Me
Me
Hf
N
O
F

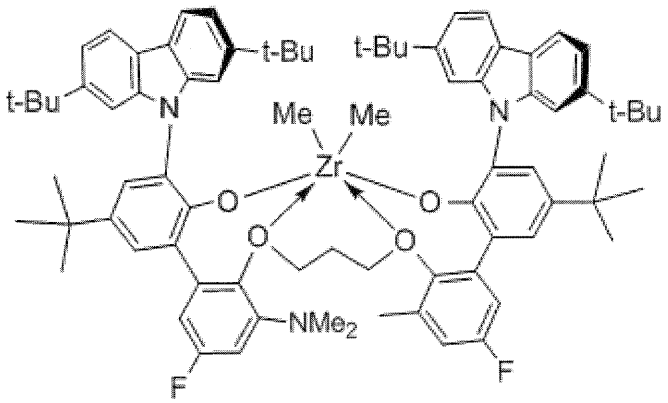

t-Bu
Me
Me
Hf
N
O
F

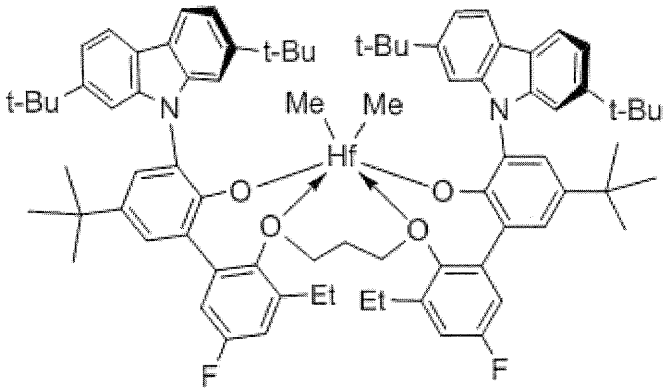

t-Bu
Me
Me
Hf
N
O

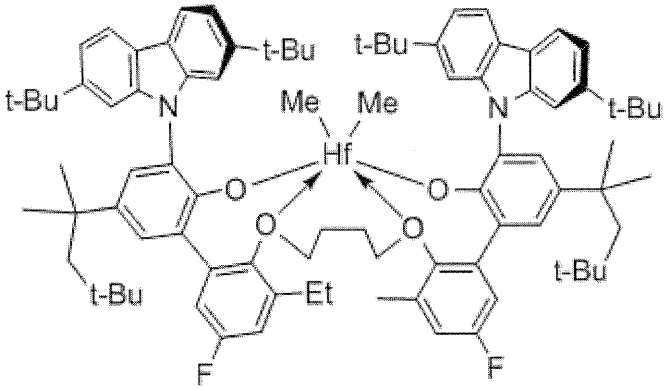

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
t-Bu
F

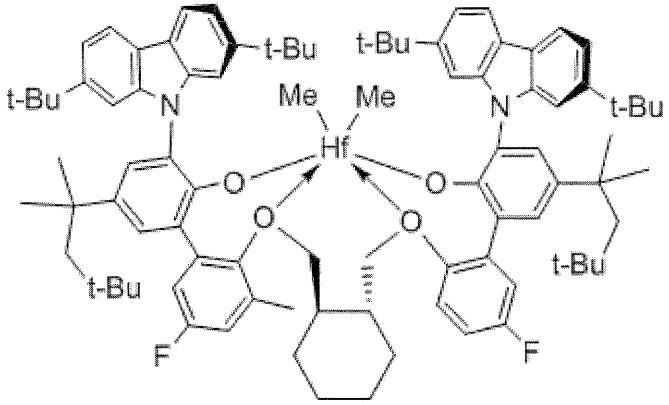

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
F
F

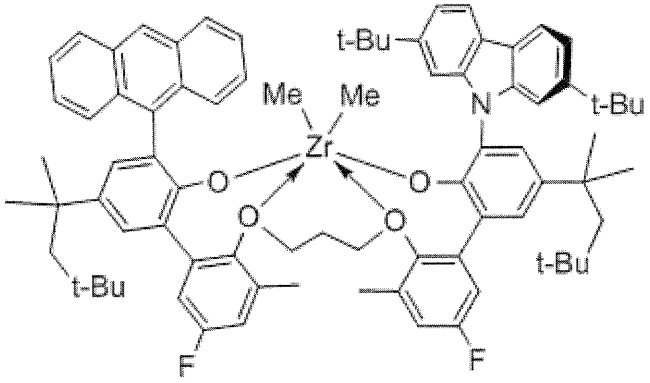

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
Me2
Si
t-Bu
t-Bu
Et
Et
F
F

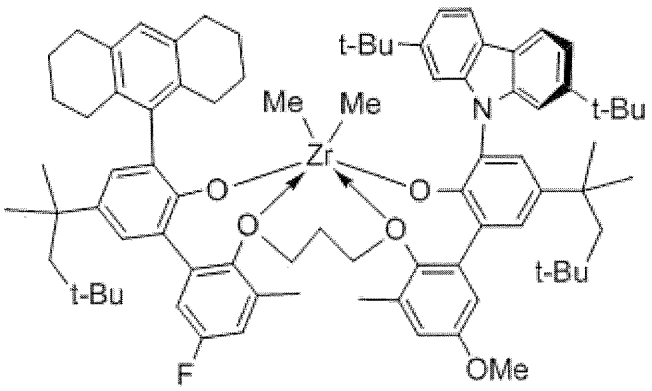

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Zr
O
O
O
O
NMe2
F
F

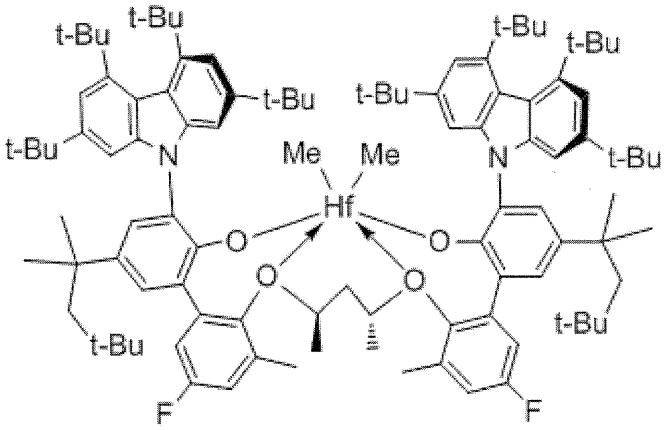

t-Bu
t-Bu
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t-Bu
N
N
Me
Me
Hf
O
O
O
O
Et
Et
F
F

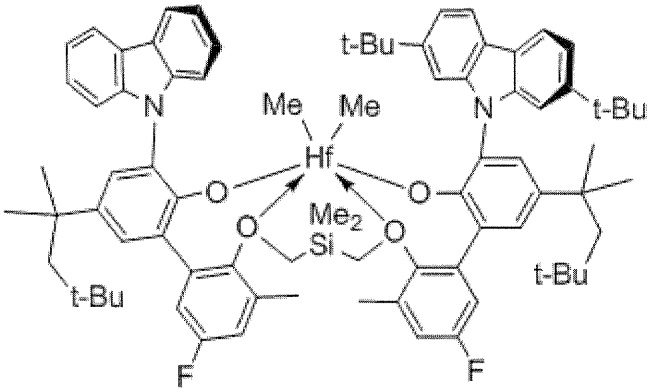

t-Bu
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N
N
Me
Me
Hf
O
O
O
O
t-Bu
Et
t-Bu
F
F

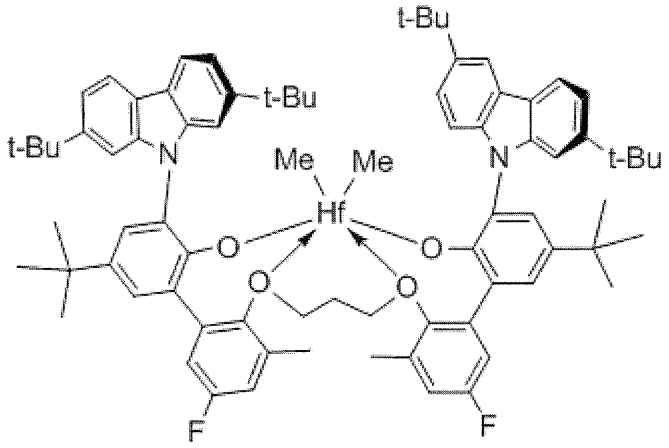

t-Bu
t-Bu
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t-Bu
N
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Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

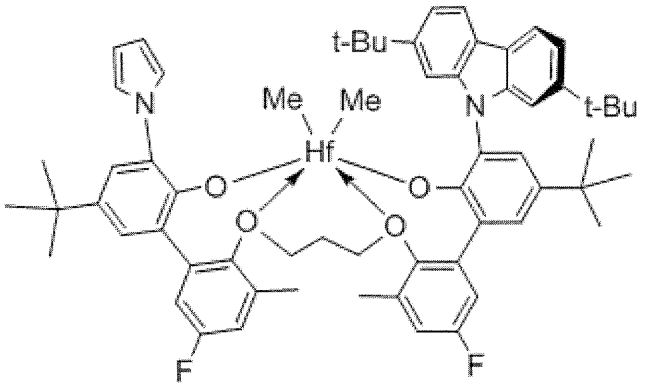

t-Bu
t-Bu
t-Bu
N
Me
Me
Zr
O
O
O
O
t-Bu
t-Bu
F
F

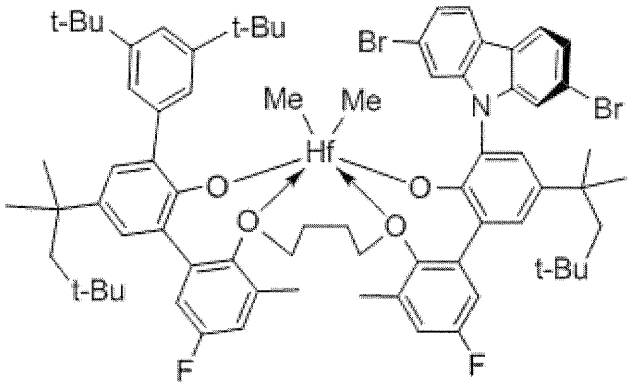

t-Bu
Me
Me
Zr
N
t-Bu
O
O
O
O
t-Bu
t-Bu
F
OMe

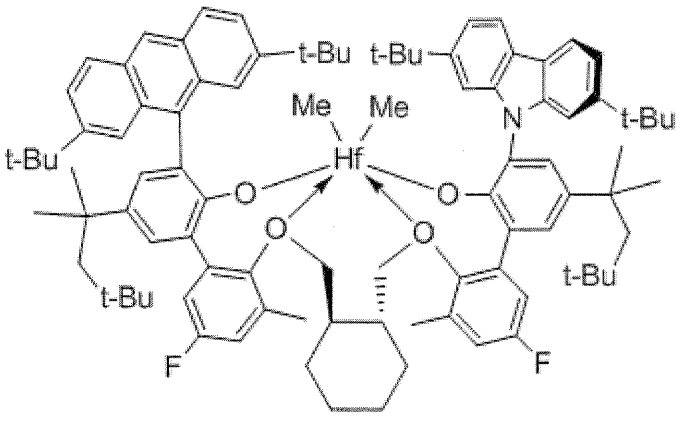

t-Bu
t-Bu
t-Bu
t-Bu
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N
Me
Me
N
t-Bu
Hf
O
O
O
O
t-Bu
t-Bu
F
F

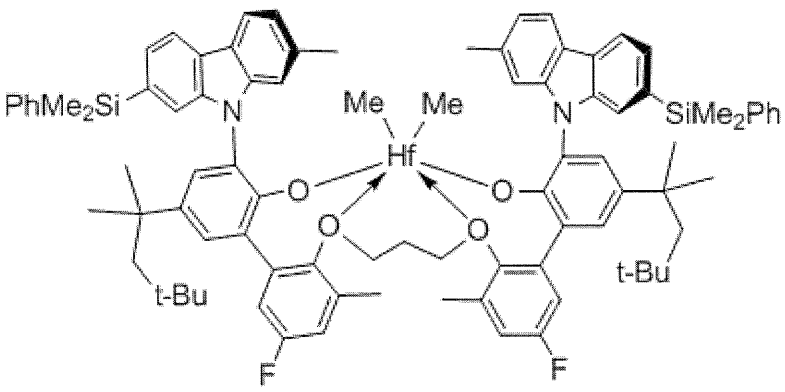

t-Bu
N
Me
Me
N
t-Bu
Hf
O
O
O
Me2
Si
O
t-Bu
t-Bu
F
F

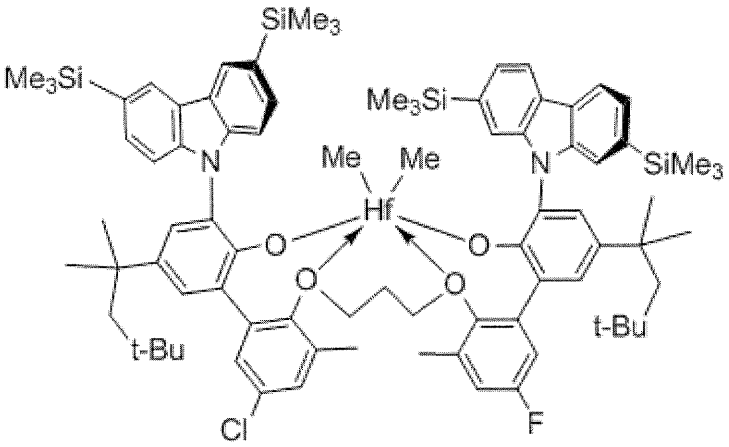

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
F
F

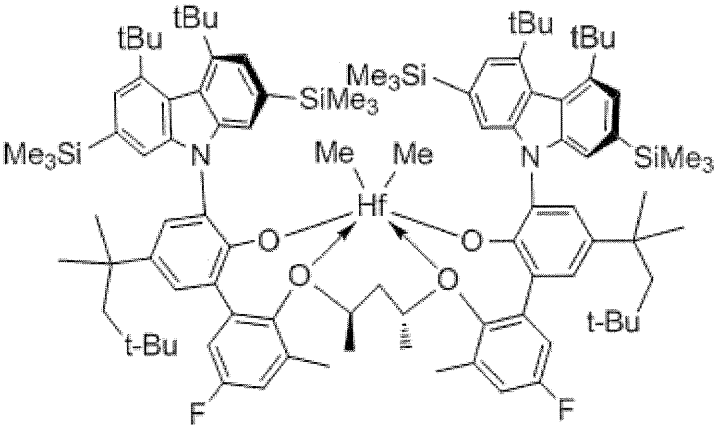

t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
F
F

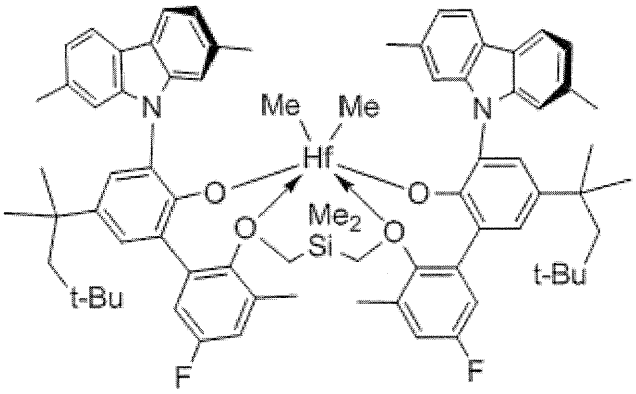

t-Bu
t-Bu
Br
Br
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

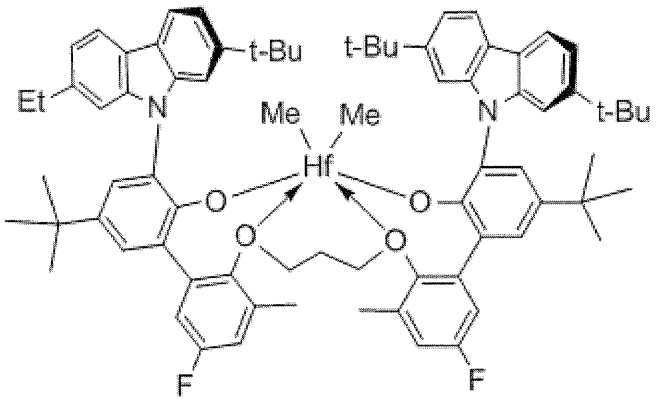

t-Bu
t-Bu
t-Bu
t-Bu
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

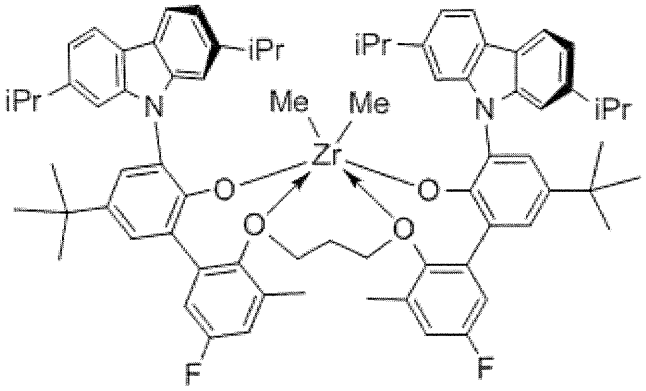

PhMe2Si
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Me
Me
Hf
O
O
O
O
N
SiMe2Ph
t-Bu
t-Bu
F
F

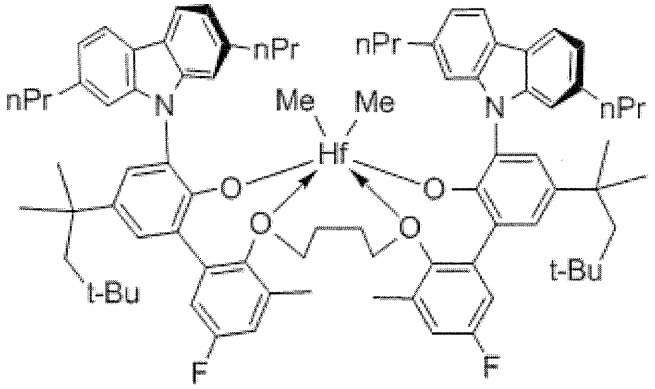

SiMe3
Me3Si
N
Me
Me
Hf
O
O
O
O
Me3Si
N
SiMe3
t-Bu
t-Bu
Cl
F

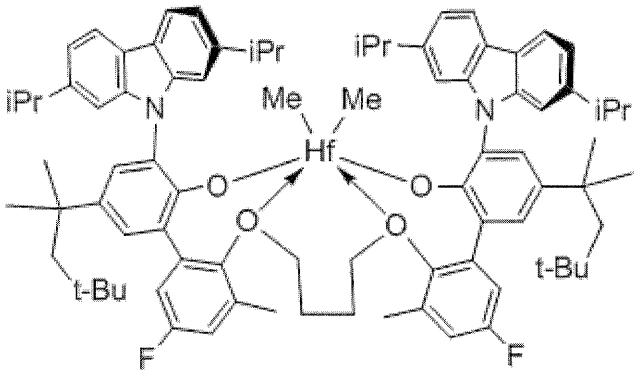

tBu
tBu
tBu
tBu
SiMe3
Me3Si
Me3Si
N
Me
Me
Hf
O
O
O
O
N
SiMe3
t-Bu
t-Bu
F
F

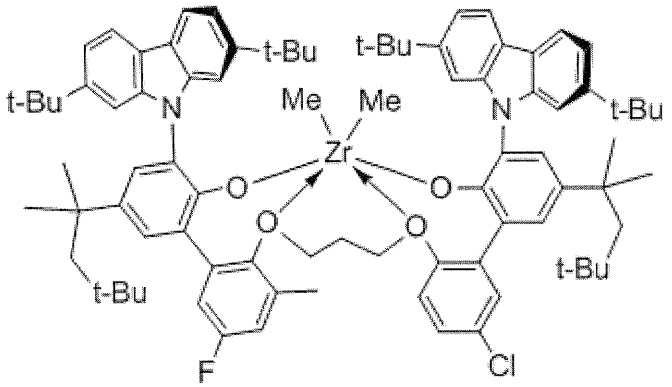

N
Me
Me
Hf
O
O
O
Me2
Si
O
N
t-Bu
t-Bu
F
F

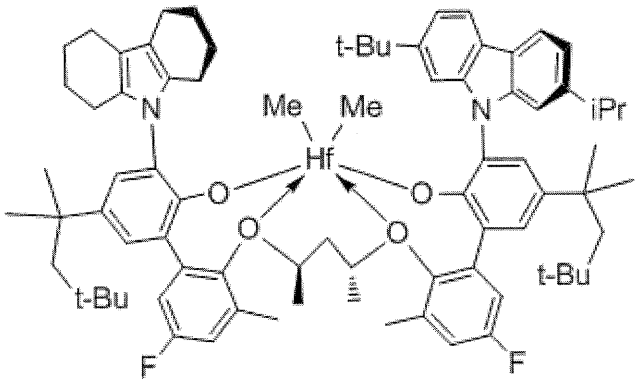

t-Bu
t-Bu
Et
N
Me
Me
N
t-Bu
Hf
O
O
O
O
F
F

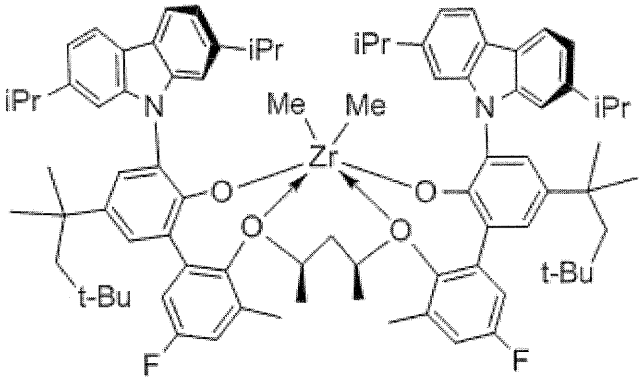

iPr
iPr
iPr
iPr
N
Me
Me
N
Zr
O
O
O
O
F
F

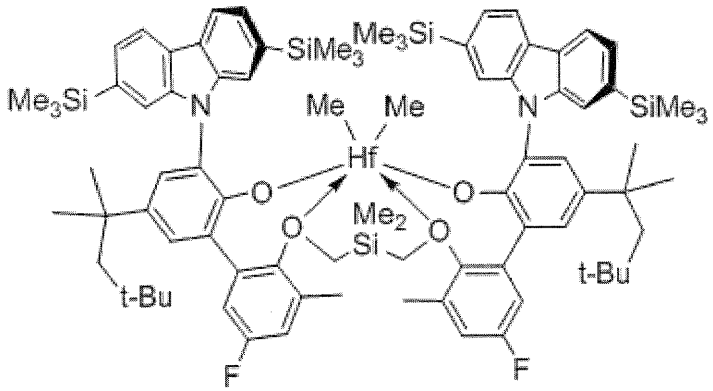

nPr
nPr
nPr
nPr
N
Me
Me
N
Hf
O
O
O
O
t-Bu
t-Bu
F
F

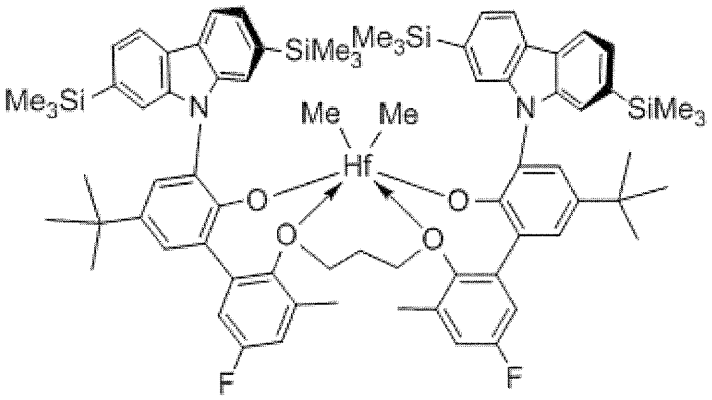

iPr
iPr
iPr
iPr
N
Me
Me
N
Hf
O
O
O
O
t-Bu
t-Bu
F
F

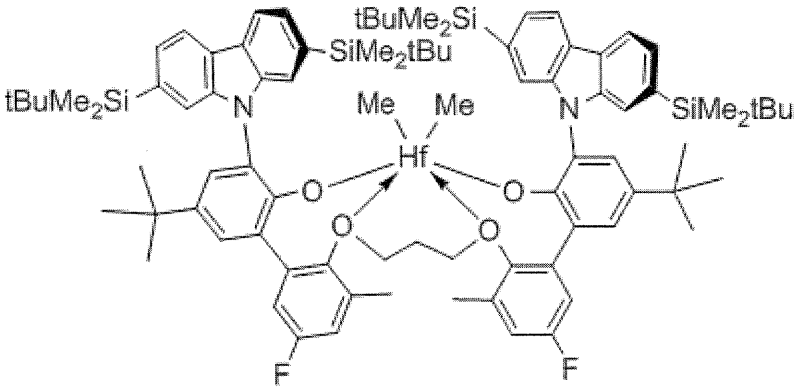

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Zr
O
O
O
O
t-Bu
t-Bu
F
Cl

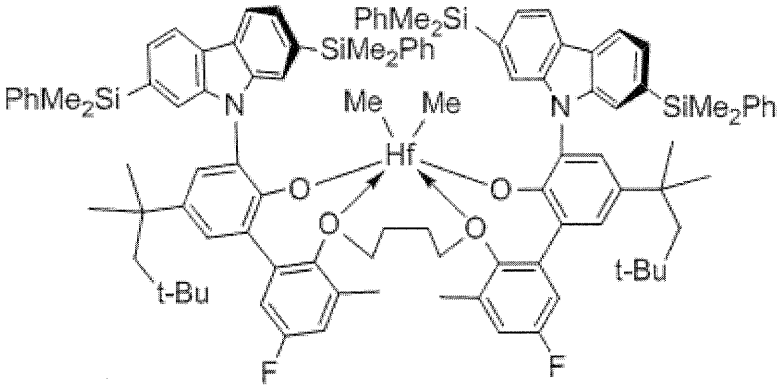

t-Bu
N
N
iPr
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

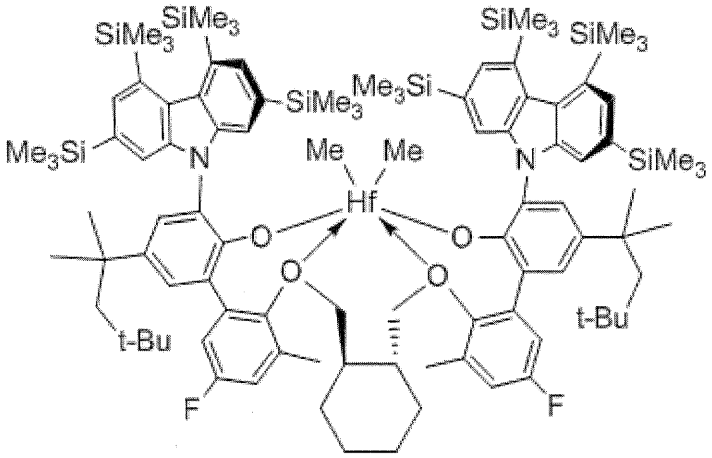

iPr
iPr
iPr
iPr
N
N
Me
Me
Zr
O
O
O
O
t-Bu
t-Bu
F
F

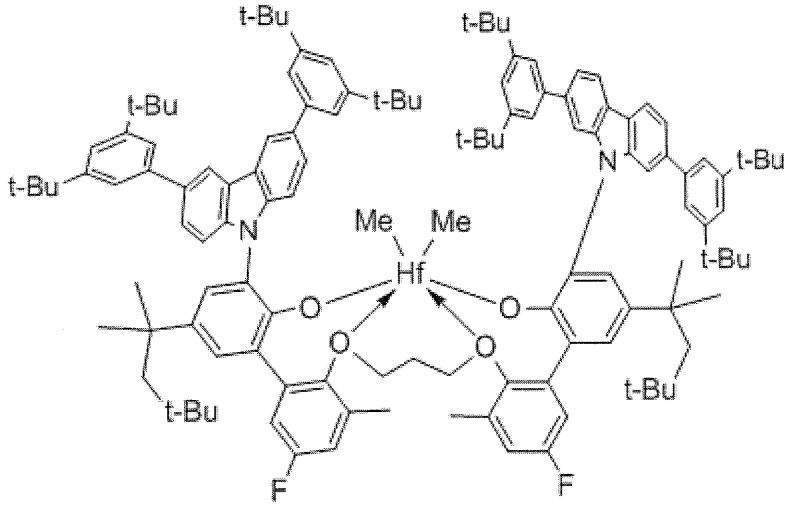

SiMe3
Me3Si
Me3Si
SiMe3
N
N
Me
Me
Hf
O
O
O
O
Me2
Si
t-Bu
t-Bu
F
F

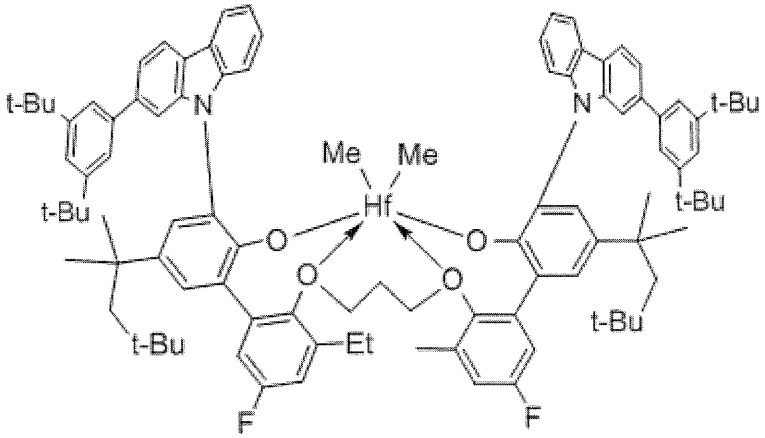

SiMe3
Me3Si
Me3Si
Me
Me
N
N
SiMe3
Hf
O
O
O
O
F
F

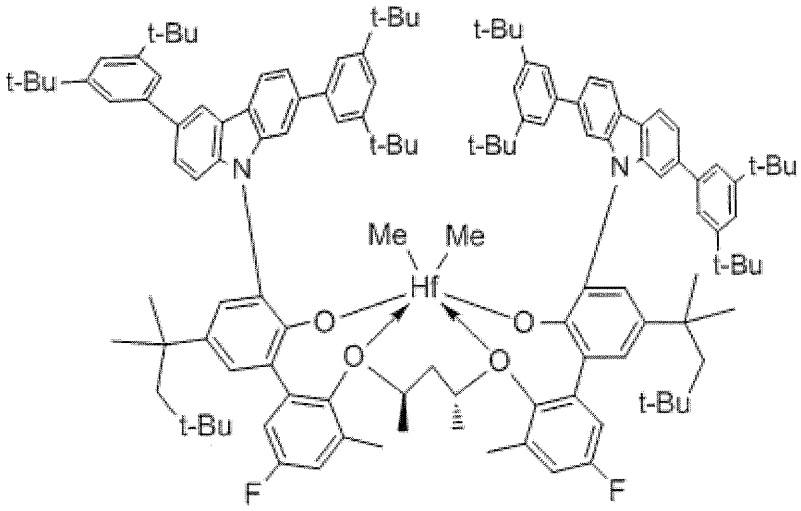

tBuMe2Si
SiMe2tBu
tBuMe2Si
Me
Me
N
N
SiMe2tBu
Hf
O
O
O
O
F
F

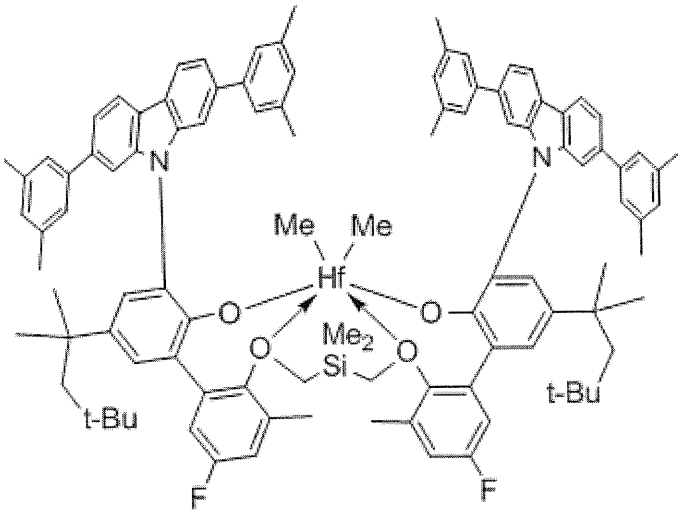

PhMe2Si
SiMe2Ph
PhMe2Si
Me
Me
N
N
SiMe2Ph
Hf
O
O
O
O
t-Bu
t-Bu
F
F

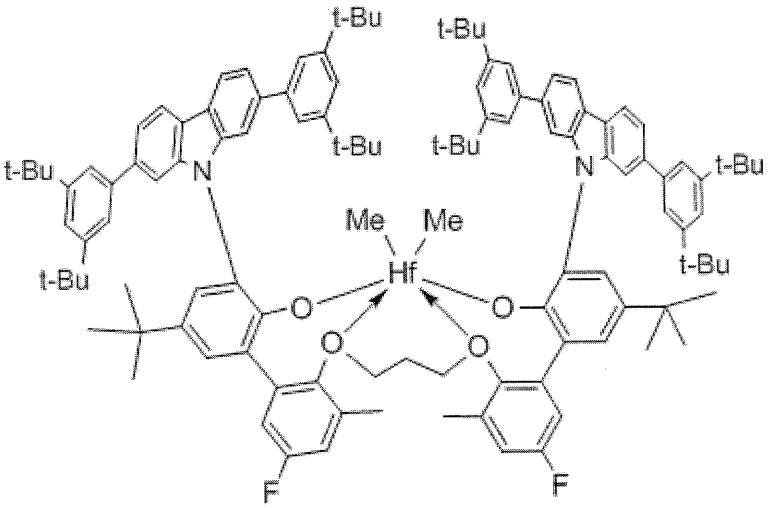

SiMe3
SiMe3
SiMe3
SiMe3
Me3Si
SiMe3
Me3Si
Me
Me
N
N
SiMe3
Hf
O
O
O
O
t-Bu
t-Bu
F
F

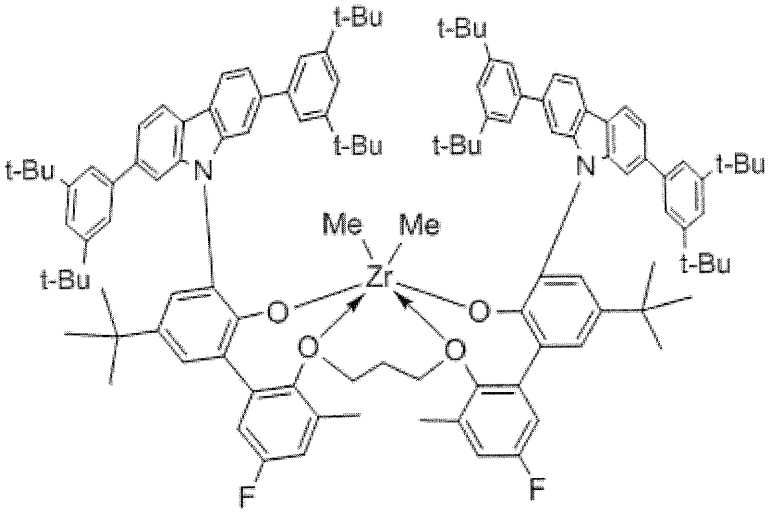

t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
F
F

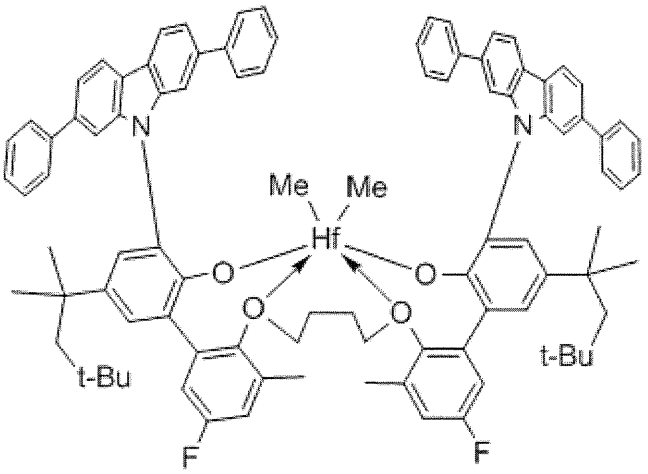

t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
Et
F
F

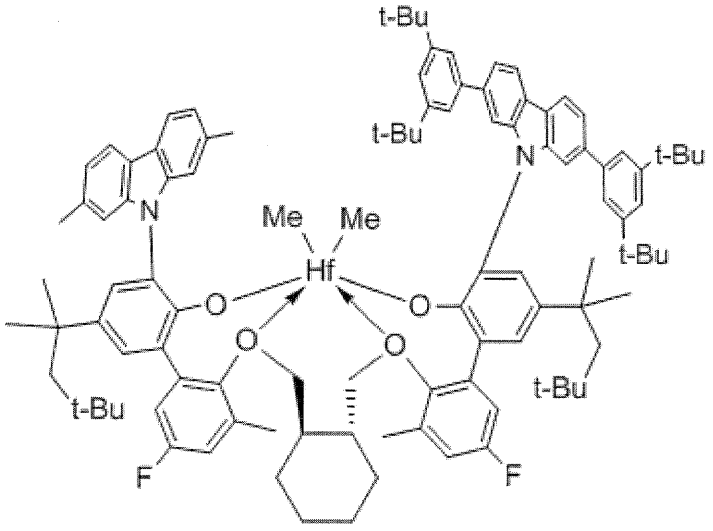

t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
F
F

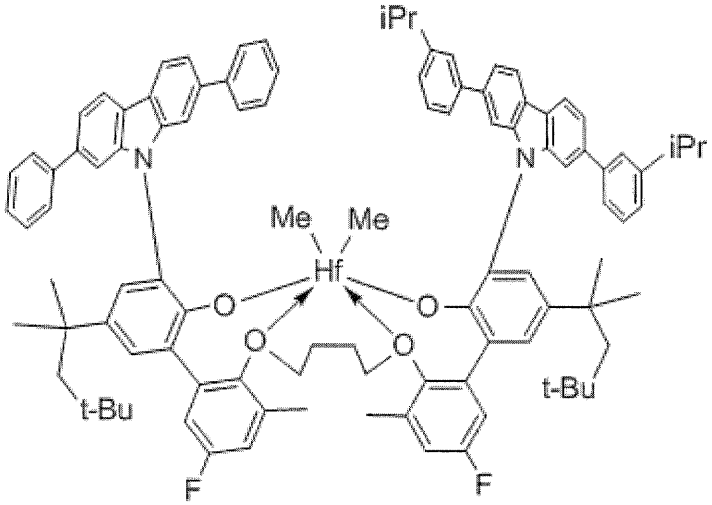

Me
Me
Hf
O
O
O
Me2
Si
O
t-Bu
t-Bu
F
F
N
N

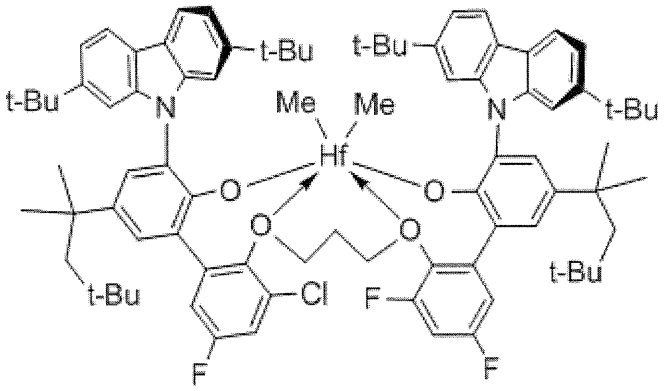

t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
Me
Me
Hf
O
O
O
O
F
F
N
N

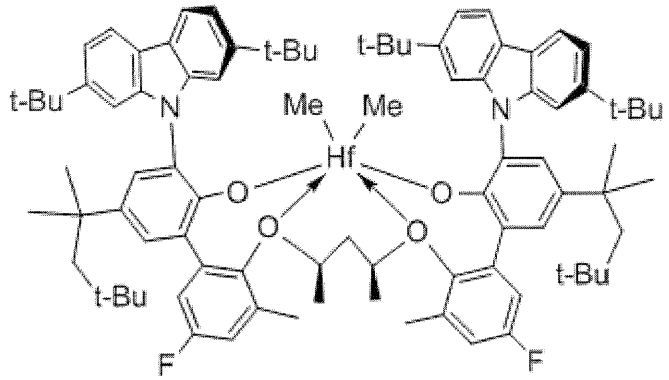

t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
t-Bu
Me
Me
Zr
O
O
O
O
F
F
N
N

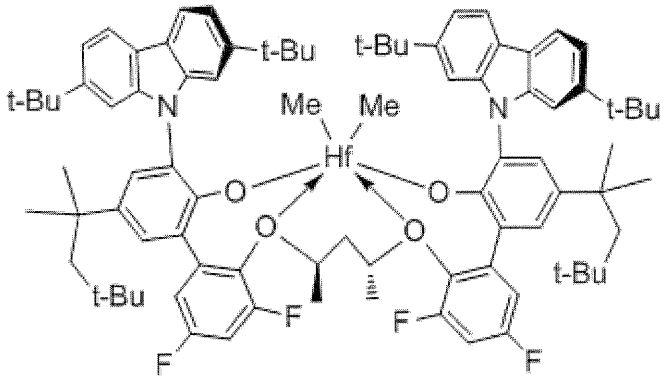

Me
Me
Hf
N
N
O
O
O
O
t-Bu
t-Bu
F
F

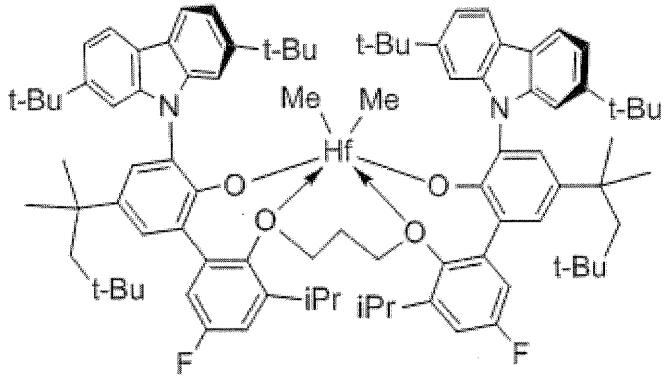

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

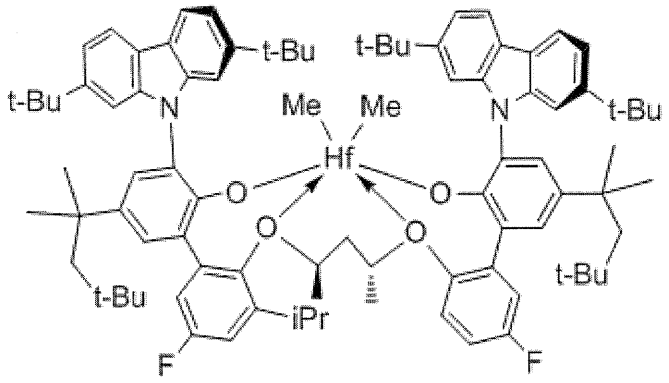

iPr
iPr
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F

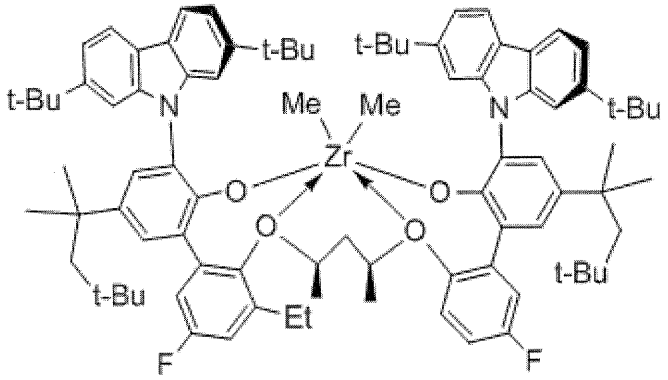

t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
Cl
F
F
F
F


t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F


t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
F
F
F
F


t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
iPr
iPr
F
F


t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Hf
O
O
O
O
t-Bu
t-Bu
iPr
F
F


t-Bu
t-Bu
t-Bu
t-Bu
N
N
Me
Me
Zr
O
O
O
O
t-Bu
t-Bu
Et
F
F

and

(b) one or more cocatalysts; wherein the ratio of total number of moles of the one or more metal-ligand complexes to total number of moles of the one or more cocatalysts is from 1:10,000 to 100:1.

5