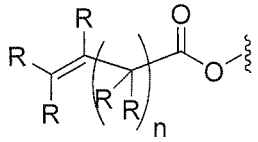
Claims

1. A process for making a patterned metal oxide structure comprising the step of heating an imprint structure comprising a polymerized organometallic compound to remove organic material and thereby form said patterned metal oxide structure, wherein the imprint structure is formed by polymerizing a resist mixture comprising at least one olefinic polymerizable compound and a polymerizable organometallic compound having at least one carboxylate of Formula 1:

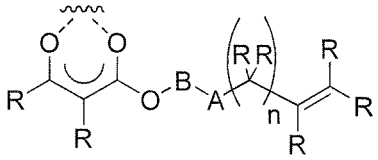


Formula 1

wherein

n is 1-12; and

each R is independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloakenyl, aryl, and aralkyl; or at least ~~one~~ two acetoacetate of Formula 2:



Formula 2

wherein

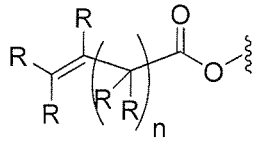
m is 0-12;

n is 0-12;

A is -(C=O)- or a bond; B is $-(CR_2)_mO-$, $-(CR_2CR_2O)_m-$, or a bond; and each R is independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloakenyl, aryl, and aralkyl.

2. A process for making a patterned metal oxide structure comprising the steps of:

(a) polymerizing a resist mixture, while in contact with a mold having imprint forming patterns thereon, to thereby form an imprint structure comprising the polymerized organometallic compound, said resist mixture comprising at least one olefinic polymerizable compound and a polymerizable organometallic compound having at least one carboxylate of Formula 1:

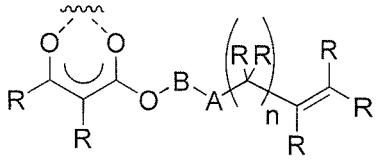


Formula 1

wherein

n is 1-12; and

each R is independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloakenyl, aryl, and aralkyl; or at least ~~one~~ two acetoacetate of Formula 2:



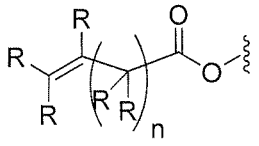
Formula 2

wherein

m is 0-12;

n is 0-12;

A is -(C=O)- or a bond; B is $-(CR_2)_mO-$, $-(CR_2CR_2O)_m-$, or a bond; and each R is independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloakenyl, aryl, and aralkyl; and

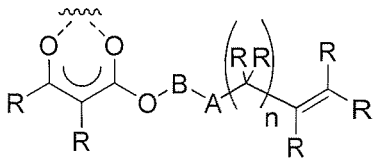


Formula 1

wherein

n is 1-12; and

each R is independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloakenyl, aryl, and aralkyl; or at least ~~one~~ two acetoacetate of Formula 2:



Formula 2

wherein

m is 0-12;

n is 0-12;

A is -(C=O)- or a bond; B is $-(CR_2)_mO-$, $-(CR_2CR_2O)_m-$, or a bond; and each R is independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloakenyl, aryl, and aralkyl;

(b) heating said imprint structure on said first area to remove organic material and thereby form said patterned metal oxide structure on said first area; and

(c) repeating steps (a) and (b) on a second area of said substrate in order to form said plurality of patterned metal oxide structures throughout the substrate.