system, sometimes even at well below the temperature conditions used for the polymerization.

**[009]** These studies have shown that the issue is not a commencement of polymerization, but a degradation of the alkoxyamine, but have not been able to provide a mechanism or an explanation.

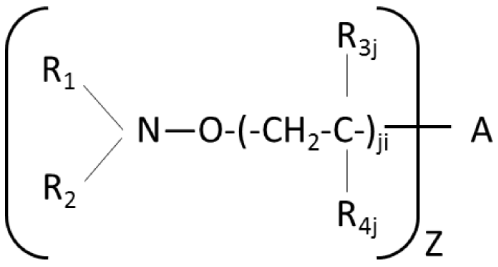
**[0010]** The applicant has therefore conducted new studies with the aim of eliminating or mitigating this problem.

**[0011]** The applicant has found that the alkoxyamines, when added to a certain reduced number of monomeric units, exhibited the desired character of stability. Stability refers to the low reactivity of a given alkoxyamine in the presence of monomer, at a certain temperature, but also to the consistency of the reactivity of an alkoxyamine left in a solvent for a given time.

**[0012]** These new entities, which are oligomeric alkoxyamines, retain their character of initiating and controlling radical polymerization reactions. In the presence of monomer, they are more stable over time at a given temperature, limiting the polymerization reactions. In the presence of solvent, they retain their kinetic character of radical initiation over time.

[Summary]

**[0013]** In an aspect, there is provided alkoxyamines of the formula:




i: monomer number of the monomer j

j: type of monomer

i taking the values from 1 to 12

j taking the values from 1 to 12

and 1 =< i X j =< 12

-A is a cyclic or noncyclic hydrocarbon group with or without a heteroatom, and may contain at least one metallic species. This

is the initiator fragment of the initial alkoxyamine used for preparing the alkoxyamine of the invention;
-$R_1$ is a cyclic or noncyclic hydrocarbon group with or without a heteroatom, and may contain at least one metallic species.
-$R_2$ is a cyclic or noncyclic hydrocarbon group with or without a heteroatom, and may contain at least one metallic species.
-$R_1$ and $R_2$ may or may not form part of the same cyclic structure.
-$R_3$ is hydrogen or a hydrocarbon group with or without a heteroatom, and may contain at least one metallic species.
-$R_4$ is a cyclic or noncyclic hydrocarbon group with or without a heteroatom, and may contain at least one metallic species.
-Z is an integer of between 1 and 10, limits included.

In another aspect, there is provided the use of an alkoxyamine as defined above for synthesizing polymers.

In another aspect, there is provided a polymer obtained in accordance with the use as defined above.

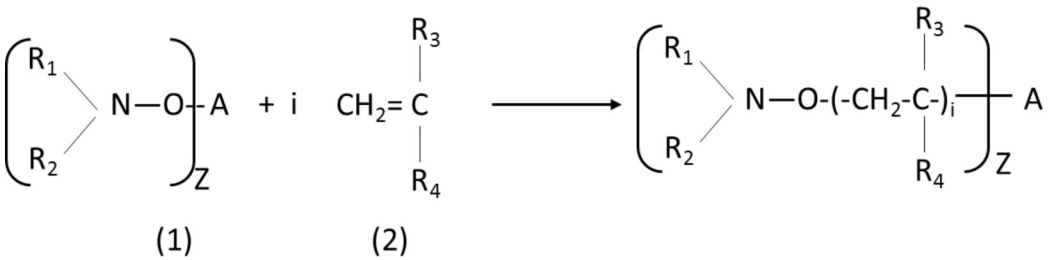
In another aspect, there is provided the use of an alkoxyamine as defined above for grafting thereof on a surface.

In another aspect, there is provided a composition comprising an alkoxyamine as defined above, a solvent and/or at least one monomer.

[Detailed description]

**[0014]** The oligomeric alkoxyamines which are a subject of the invention are obtained by addition of the alkoxyamines (1) to at least one monomer (2) exhibiting a double bond.

**[0015]**




**[0016]** When the alkoxyamines (1) are added to a plurality of monomeric units, the units may be of the same monomer or of different monomers – hence the more general formula of the alkoxyamines that