fluoropolyoxyalkylene chain (R_f) having two chain ends, each chain end comprising at least one hydroxy group, and b) the corresponding alkoxide of perfluoropolyether (P_{pol}) [PFPE (P_{alk})], wherein the equivalent concentration of PFPE (P_{alk}) in PFPE (P_{pol}) is lower than 30%, preferably ranging from 5% to 15%;

2) contacting mixture (M) with a perhalocyclophosphazene (CP_{halo}) to provide a mixture (M1) containing an equivalent ratio of PFPE (P_{alk})/(CP_{halo}) of at least 1;

3) allowing mixture (M1) to react until complete disappearance of P-Cl groups to provide a mixture (M2);

4) submitting mixture (M2) to hydrolysis to provide a mixture (M3);

5) optionally removing (P_{pol}) from mixture (M3) to provide a mixture (M4).

[0013] **WO 03/067285** (CORNING INCORPORATED) discloses compounds having an aromatic or heteroaromatic moiety, at least two fluorinated alkylene, arylene or polyether moieties, each fluorinated alkylene, arylene or polyether moiety being linked to the aromatic or heteroaromatic moiety through an -O- or -S- linkage; at least one ethylenically unsaturated moiety, each ethylenically unsaturated moiety being linked to one of the fluorinated alkylene, arylene or polyether moieties.

[0014] **US 2005/0277558** (HITACHI GLOBAL STORAGE TECHNOLOGIES NETHERLANDS B.V) discloses a lubricant composition for use as a lubricant for magnetic recording media, comprising a first liquid lubricant and a second liquid lubricant, wherein the first liquid lubricant contains a cyclotriphosphazene ring attached to at least one perfluoropolyether having a single terminal hydroxyl group, and the second liquid lubricant contains a perfluoropolyether having two end groups selected from hydroxyl, tertiary amine, and combinations thereof.

Summary

[0015] The Applicant has perceived that the industry of the magnetic recording media (MRM) is always looking for new polymers that can be used as lubricants, in particular in Magnetic Recording Media (MRM).

[0016] Thus, in a first aspect the present disclosure relates to a polymer [polymer (P)] comprising:

- at least one (per)fluoropolyether chain [chain (R_{pf})] and
- at least one chain [chain (C)] comprising at least one hydroxy group and at least one group [group (H)] comprising a heteroatom selected from the elements belonging to group 15 of the periodic table,

provided that polymer (P) does not comprise amide group(s) and is different from a polymer of formula

$R^1RN-[CH_2]_r-[CF_2O]_s-[CF_2CF_2O]_t-[CF_2O]_u-CF_2-[CH_2]_v-NRR^1$

wherein

r, s, t, u and v are independently zero or an integer, with the proviso that s, t and u are not all zero, and

R and R^1 are independently selected from $-[OCH_2CH_2]_yOH$, $-OCH_2CH(OH)CH_2OH$, $-CH_2CH_2OH$ and $-CH_2CH_2CH_3$.

[0017] More preferably, said heteroatom selected from the elements belonging to group 15 of the periodic table is nitrogen or phosphorous.

[0018] When the heteroatom is phosphorous, it is preferably phosphorous(III) and said at least one group (H) is a phosphino group and the polymer (P) will be hereinafter referred to as polymer (P_P).

[0019] When the heteroatom is nitrogen, it is preferably nitrogen(III) and said at least one group (H) is an amino group, more preferably a secondary or tertiary amino group, and the polymer (P) will be hereinafter referred to as polymer (P_N).

[0020] The Applicant has found that advantageously, when chain (C) comprises at least one heteroatom belonging to group 15 of the periodic table, said heteroatom retains its base properties and behaves as Lewis base, such that polymer (P) is less subject to the degradation process catalysed by the Lewis acids that may be present in the head-disk environment.

[0021] In addition, the presence of at least one hydroxy group in polymer (P) allows to increase the adhesion of the polymer itself to the magnetic layer or to the carbon overcoat of the MRM.

[0022] In a second aspect, the present disclosure relates to the use of polymer (P) as defined above as lubricant for magnetic recording media (MRM).

[0022a] In another aspect, the present disclosure relates to a process [process P_N] for the manufacture of polymer (P_N) described herein, said process comprising the following steps: (a) providing at least one PFPE alcohol, (b) reacting said PFPE alcohol with a compound bearing at least one sulfonic group to obtain a sulfonic PFPE ester, (c) reacting the sulfonic PFPE ester obtained in step (b) with at least one organic amine to obtain polymer (P_N).

[0022b] In another aspect, the present disclosure relates to a process [process P_N*] for the manufacture of polymer (P_N*) described herein, said process comprising the following steps:

(a*) providing at least one PFPE alcohol,

(b*) reacting said PFPE alcohol with a compound bearing at least one sulfonic group to obtain a sulfonic PFPE ester,

(c*) reacting the sulfonic PFPE ester obtained in step (b) with at least one polyamine to obtain a PFPE-oligomer comprising at least two chains (R_{pf}),

(d*) optionally purifying the PFPE-oligomer obtained in step (c),

(e*) reacting said PFPE-oligomer with at least one monoamine to obtain polymer (P_N*).

[0023] In a further embodiment, the present disclosure relates to a method for lubricating a magnetic recording media (MRM), said method comprising providing a